STEEL

The

Metalworking Weekly

AUGUST 29, 1960

A PENTON PUBLICATION

New Tools Attack Your Cost Line

"The Machine Tool Exposition—1960 is designed to stimulate a whole new wave of equipment modernization in the U. S.," says Alan C. Mattison, president, National Machine Tool Builders' Association. As he sees it, industry's best chance to survive in already tightening markets is to cut costs—and equipment modernization is one way to do it.

In Chicago, beginning next week, builders at three shows will attempt to get an industry buying surge started.

STEEL has prepared a special section designed to help you get the most out of those shows. In it you'll find:

- Over 120 significant developments that will be shown.
- A description of more than 70 new machines that will make their debut.
- The names of the exhibitors and where to find them.

The section starts on Page 145.

What the Reds Are Buying from Us

Maintenance: Ripe for Cost Cutting

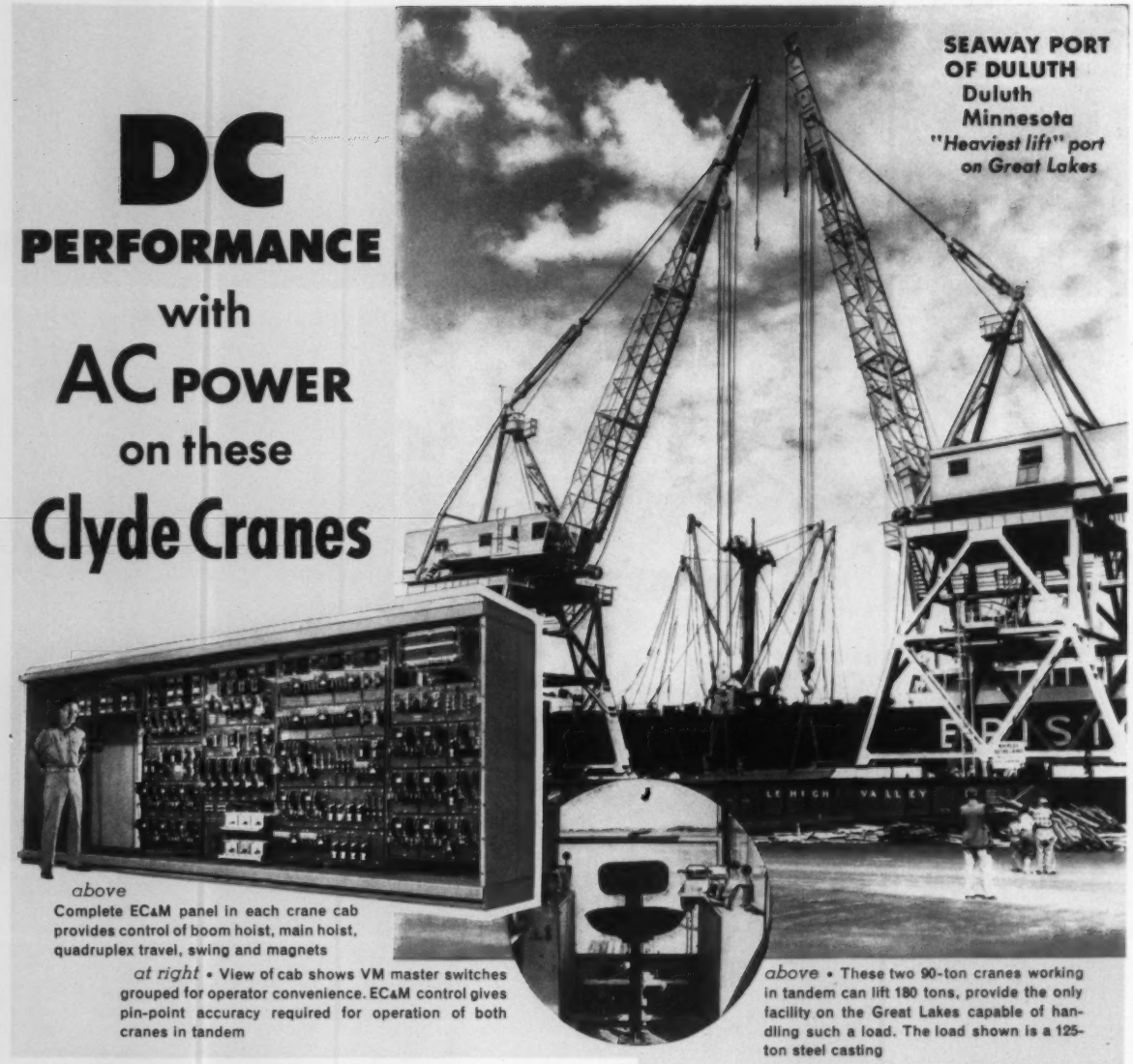
Metalworkers to Spend $384 Million For Machine Tools in Second Half

Pick the Right Material

No. 18 in STEEL's Program for Management

CONTENTS—TURN PAGE

DC PERFORMANCE with AC POWER on these Clyde Cranes



SEAWAY PORT OF DULUTH
Duluth
Minnesota
"Heaviest lift" port on Great Lakes

above
Complete EC&M panel in each crane cab provides control of boom hoist, main hoist, quadruplex travel, swing and magnets

at right • View of cab shows VM master switches grouped for operator convenience. EC&M control gives pin-point accuracy required for operation of both cranes in tandem

above • These two 90-ton cranes working in tandem can lift 180 tons, provide the only facility on the Great Lakes capable of handling such a load. The load shown is a 125-ton steel casting

EC&M "HWR" CONTROL does it safer, simpler

EC&M's HWR Controllers provide AC cranes with all the advantages of DC hoist control. Smaller hoist motors can be used than in equivalent AC systems. Moreover, HWR control, with its series motor and brake, provides the simplest and safest operation.

Highly efficient silicon rectifiers (self-contained in the controller) furnish the DC power. Exclusive WRIGHT dynamic lowering circuit combines high-speed handling with accuracy in spotting any load.

HWR controllers are easy to install. On EOT cranes, only four power collectors are needed. Circuitry is simple and the controller is easy to inspect. If you would like DC performance with AC power, check into EC&M's HWR controller.

Get the complete story on HWR controllers. *Your Square D Field Engineer can give you the facts, or write Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio*

SQUARE D COMPANY
EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

4175

This Week in STEEL

The Metalworking Weekly

August 29, 1960 Vol. 147 No. 9

What the Reds Are Buying from Us

Name your product and chances are good that it's among those for which the government is granting export licenses to the Soviet bloc. Examples:

Radio, TV, electronics	Shoe machinery, parts	Passenger cars
Air conditioners	Accounting machines	Aircraft engines
Industrial furnaces	Movie cameras, parts	Fork lift trucks

The list is surprisingly long, and the Soviets are showing increased interest in our products. PAGE 101

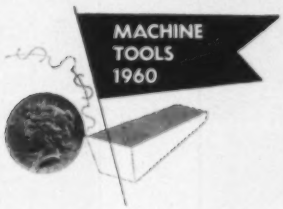
Maintenance: Ripe for Cost Cutting

Studies made by management consultants indicate that few maintenance departments operate at more than 50 per cent of efficiency. Eleven steps by which you can obtain better control of your maintenance are presented in checklist form. PAGE 104

Pick the Right Material

Choice of the best material for any given job (no matter what you call the procedure or how you approach the problem) is a key to profitability—even to survival—say metalworking managers. For No. 18 in STEEL's Program for Management in 1960, turn to PAGE 111

New Equipment Will Help You Cut Your Production Costs



In place of its usual technical section, STEEL this week presents a section devoted to three equipment shows opening in Chicago on Sept. 6 and 7. The section points out more than 120 significant developments, carries more than 70 items on new machines, tells who will exhibit and where. You'll also find two outlook stories. PAGE 145

Machine Tool Orders: The Trend Is Up

Most of the orders for machine tools during the second half, 1960, will be placed after prospective buyers look over the new lines in Chicago next week and the week following. Look for orders from metalworking companies to total $384 million vs. $336 million in first half, 1960. PAGE 146

Basic Oxygen Leads in Steelmaking

Despite continuing weakness in steel demand, which has dropped the national steel operating rate to about 50 per cent, producers of oxygen steel are operating their furnaces above 80 per cent of capacity. Efficiency, versatility, and modern facilities are the main reasons. Look for the trend to continue through the fourth quarter. Also look for the growth of this process to continue. Three more producers are preparing to install oxygen converters and three or four others are giving serious thought to such installations. PAGE 237

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KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Thermal Stress-Relieving of Alloy Steels

In the production of alloy steel bars and parts made of alloy steel, stresses are sometimes set up, and these stresses must be relieved before optimum results can be expected. Two general types of stress-relieving are practiced—thermal and mechanical. In this discussion we shall consider only the former.

There are several important reasons for thermal stress-relieving. Among these are the following:

(1) The first and most fundamental purpose is to reduce residual stresses that might prove harmful in actual service. In the production of quenched and tempered alloy steel bars, machine-straightening is necessary. This induces residual stresses in varying degrees. Bars are usually stress-relieved after the straightening operation. When the bars are subjected to later processing that sets up additional stresses, subsequent stress-relieving may be necessary.

(2) A second major purpose of thermal stress-relieving is to improve the dimensional stability of parts requiring close tolerances. For example, in rough-machining, residual stresses are sometimes introduced, and these should be relieved if dimensional stability is to be assured during the finish-machining.

(3) Thermal stress-relieving is also recommended as a means of restoring mechanical properties (especially ductility) after certain types of cold-working. Moreover, it is required by the "safe-welding" grades of alloy steels after a welding operation has been completed.

Alloy bars are commonly stress-relieved in furnaces. Temperatures under the transformation range are employed, and they are usually in the area from 850 deg to 1200 deg F. The amount of time required in the furnace will vary, being influenced by grade of steel, magnitude of residual stresses caused by prior processing, and mass effect of steel being heated. After the bars have been removed from the furnace, they are allowed to cool in still air to room temperature.

In the case of quenched and tempered alloy bars, the stress-relieving temperature should be about 100 deg F less than the tempering temperature. Should the stress-relieving temperature exceed the tempering temperature, the mechanical properties will be altered.

Items other than bars (parts, for example) can be wholly or selectively stress-relieved. If the furnace method is used, the entire piece is of course subjected to the heat; selective relieving is impossible. However, if a liquid salt bath or induction heating is used, the piece can be given overall relief or selective relief, whichever is desired.

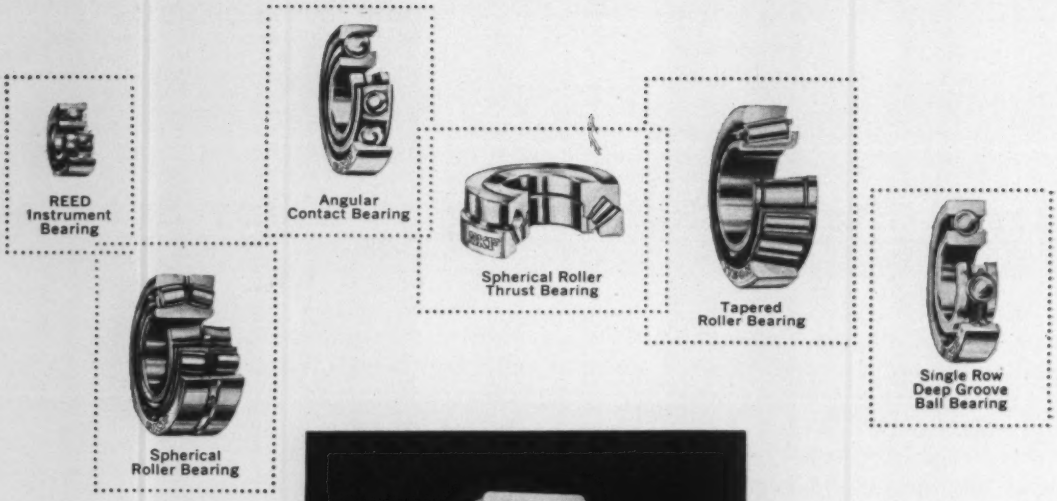
Detailed information about stress-relieving is available through Bethlehem's technical staff. And remember that we can furnish the entire range of AISI standard alloy steels, as well as all carbon grades.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

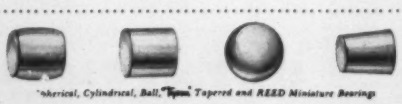


What's a "special size" in production bearings?

SKF makes so many standard sizes, there's practically no such thing as a "special size" of bearing. They range from tiny instrument bearings right up to four-row tapered roller bearings—and account for almost every possible bore size in-between.

Take SKF's standard cylindrical roller bearing, for example. It's promptly available in 154 sizes of single- and double-row types —for shaft diameters ranging from 1" to 9.5". Every size, in both types, offers high radial capacity in relation to its size and operates at highest speeds because of its very low friction.

So, before you specify a "special size" bearing, call the nearest SKF sales office first. The odds are better than 1,000 to 1 that there's already a standard SKF bearing of exactly the size you need. 6007



Spherical, Cylindrical, Ball, Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE
SKF®
SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

"For the ultimate flexibility in automatic welding, don't 'marry' one particular process."

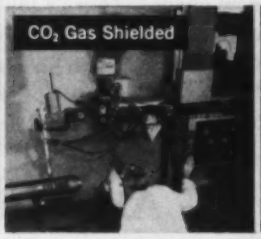
Consider the future. Select equipment that keeps ahead of obsolescence. Today you may weld mild steel. Next year it may be high strength steel, or perhaps aluminum. Five years from now...who knows? With new welding advances being made every day, you must stay ahead of the field."

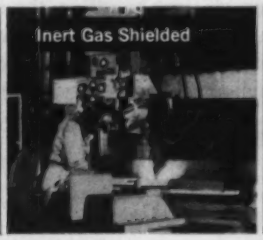
PLAN AHEAD with HOBART

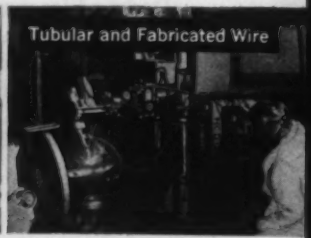
...use automatic welding equipment that's convertible and can be easily adapted to the newer metal working materials and processes.

Ask for Illustrated Bulletin covering latest automatic welding process.

Submerged arc welding


CO_2 Gas Shielded


Inert Gas Shielded


Tubular and Fabricated Wire

HOBART WELDERS · ELECTRODES

HOBART BROTHERS COMPANY, BOX ST-80, TROY, OHIO, Phone FE 2-1223

"Manufacturers of the world's most complete line of arc welding equipment"

"Very pleased with all the advantages offered by Tri-Lok. Always prefer shipments to be made in this form due to handling ease, safety and convenience."
NEW YORK SMELTER

"TRI-LOK ingots cut our unloading time quite a bit. They don't shift in bundles . . . but stay in place for easy storing and fork-lift handling."
MIDWEST ALUMINUM PRODUCTS MANUFACTURER

"ALCAN TRI-LOK ingots arrive compact and stay compact until we use them. They stack safely, stably—even three or four bundles high. And when straps are cut, they stay in place until fork-lift pickup."
CALIFORNIA EXTRUDER

"We're very enthusiastic about new ALCAN TRI-LOK ingots. Always liked Alcan ingot anyway . . . even more so with Tri-Lok. Mainly from point of view of stacking and handling."
EASTERN EXTRUDER

Despite the stability of TRI-LOK bundles, there's never a separation problem—*just lift to separate!*

Here are some typical examples of what users are saying about Aluminium's newest ingot development—ALCAN TRI-LOK ingot.

Designed for more efficient handling, the new ingots lock one to another, not in just one, but in three different ways. The resultant stability means greater speed, simplicity and safety wherever ingots are handled.

In car unloading, you find bundles arrive in excellent condition ready for quick pickup by fork lift truck. In-plant moves, too, are greatly simplified because no pallets or special slings are needed. Even after strap removal, TRI-LOK bundles remain securely intact on trucks, floors or inclined ramps.

See for yourself how TRI-LOK ingots improve worker safety . . . save time in carrying, storing and remelt charging. Just telephone or write us today.

Aluminium Limited

ALCAN

Ingot Specialist...serving American Aluminum Fabricators—

In the U.S.—Aluminium Limited Sales, Inc., 630 Fifth Avenue, New York 20, N.Y.

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STEEL

Servicenter

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

August 29, 1960

Our Fight for Survival in New World Market

Next week, STEEL's editors will offer you one of the most comprehensive examinations of the world market ever reported in the business press. This in-depth probe will present facts about our standing in global markets, show what competitors are doing to gain more of the markets, and indicate the road ahead for U. S. industry.

In brief, the entire issue of Sept. 5, with the exception of our New Products & Equipment section and our traditional market pages, will be devoted to the theme: "Our Fight for Survival in the New World Market."

Highlights of the Battle

Here's a preview of what you'll find next week: Wage rates around the globe; the export-import situation and predictions of trends; jobs lost to Americans; interviews with domestic and foreign business leaders; what the U. S. is doing and will do to help our business abroad; the facts behind industrial capacity increases in Europe and Japan; the plans of five automakers for regaining lost markets overseas; what companies are doing to counteract the export-import swing; a wrapup of major foreign steelmaking processes and their impact on the U. S.; trends in nonferrous exports and imports — tables, charts, and pictures will round out one of the most penetrating studies ever made in the history of STEEL. It's the product of nearly every editor on the staff as well as our team of correspondents in such diverse places as Dusseldorf, Johannesburg, Toronto, and Tokyo.

The Challenges Reiterated

This special issue is a consolidation and expansion of the challenges to metalworking that STEEL's editors have pointed up repeatedly. We know there is increasing awareness of the problems posed by foreign competition. Evidence: At press time, we had filled requests for 30,928 copies of Editor Walt Campbell's testimony on the impact of foreign competition given before the House Appropriations Subcommittee on Foreign Operations (STEEL, May 2, 1960). The cases cracked by STEEL's Acton Chance drew requests for 52,400 reprints. ("The Case of the Vanishing Jobs," Apr. 6, 1959, and "The Case of the Vanishing Taxes," May 11, 1959.) Both dealt with losses suffered by our economy as a result of foreign encroachment of markets.

Backing a Counterattack

Among the hundreds of people our editors have interviewed for the issue is S. J. Rundt, head of the international business consulting firm in New York that bears his name. Editor Campbell's Aug. 1 editorial, "Counterattack," prompted Mr. Rundt to write:

"I am delighted with the contents, lucidity, and forthrightness of your 'Counterattack.' I would like to add this:

"It is surely true that 'we can know what is coming in the new markets aboard' and that 'we can better anticipate their needs and be ready to meet them.' But many a concern here is either: 1. So filled by its own presumed omniscience. 2. Or by the idea that we 'are the best' that we often miss the boat. We are not invariably the most outstanding world traders —although many here are among them . . .

"The most dangerous aspect militating against our companies becoming the 'biggest and the best' on global markets is rarely known and hardly ever mentioned:

"We live in an era of much hyprocrisy and highly orchestrated 'media of communications.' The Madison Avenue boys put all sorts of colored spectacles on us. This great nation has become complacent, self-satisfied, imbued with its own (assumed) invulnerability and superiority.

"Some of our nation's greatest failures are publicly presented as successes, while some of the most inconsequential events are hysterically blown up beyond any real size . . .

"Let us know what we do not know. Let us not swagger about, as if we were 'out of this world.' In international business, let us face politics, which is unpleasant, because politics rules economics. (We see this in talks with clients. They are

TIME SAVINGS!

Here's how Ex-Cell-O's Numera-Trol system of tape-controlled precision machine tools cuts costs for three modern manufacturers . . .

Precision Contouring Machine, controllable to .000025", saves 112 hours lead time, 54 hours grinding time in production of this templet.

Large steam turbine blade is produced by Precision Profiling Machine. Lead time saved, 120 hours; machining time saved, 78 hours.

Fuel control cam, produced by Precision Cam-Milling Machine, goes from performance curve to machined part in just 47.5 hours. Former method took 230 hours.

How many hours can Ex-Cell-O Numera-Trol save for you? For a prompt answer, see your Ex-Cell-O Representative, or call or write direct—and be sure to ask for your free copy of "A Guidebook to Numerically Controlled Machine Tools."

NUMERA-TROL (XLO)

PRODUCED BY

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN 60-58

EX-CELL-O FOR PRECISION

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION

Servicenter

finally willing to look at rising political risks abroad.) It is Marxist to believe that economics rule politics, i.e., history. Being a disbeliever in Marx, I hold with the unpleasant but undoubted primacy of history (i.e., politics) over economics."

You'll find more of Mr. Rundt's beliefs in next week's issue.

Our Tokyo Correspondent . . .

. . . who in this case can only be identified as MPL, will accord a vehement second to Mr. Rundt's views on political risks. This report was filed last June 20 at the height of student and union member demonstrations: "I've just returned from the American Embassy Annex. All the Embassy buildings are surrounded by policemen. Columns and columns of 'demonstrators'—Zengakuren and union members—were marching by with their red flags flying, loudly singing the Communist Internationale. It is disconcerting to say the least! The tune is so similar to 'Maryland, My Maryland,' I feel an extra surge of indignation.

"Americans have been instructed to avoid the demonstrators as much as possible, refrain from taking pictures of them, from doing anything which might trigger an overt act of hostility. It's all interesting and exciting—frustrating and maddening. One wonders where the voice of the so-called majority is—since, we are told, as I'm sure the press in the U. S. reports, that these demonstrators are only an articulate minority and don't truly represent the feelings of most Japanese. While I guess having the Communists take over is not imminent, I'm sure this is the way it goes when they do."

That's a summary and a behind the scenes glimpse of the goings on that preceded next week's offering. Watch for, read, and use the issue. We think you'll find it is a significant work to add to your business library.

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—August, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—you will win $500.

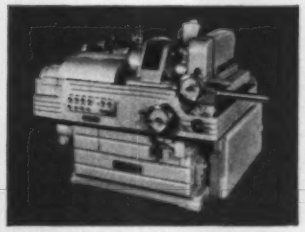
There's more . . . You will win an additional $500 if you furnish written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

You can enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is Oct. 1, 1960.

THREAD GRINDING COSTS TOO HIGH?

Here's How a Modern Ex-Cell-O can Increase Production and Lower Your Labor Costs

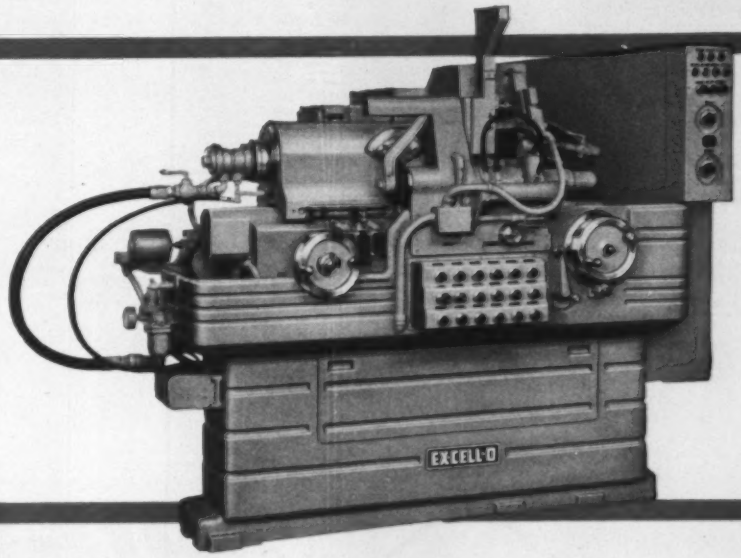


1939—Style 39 Ex-Cell-O Internal Thread Grinder, then the fastest of its kind, produced 17 automotive steering gear ball races per hour. It had power wheel dresser, automatic dresser compensation and automatic wheel feed.

1946—The part's the same, but the manufacturer has turned to a postwar Ex-Cell-O Style 39-A Precision Thread Grinder with fully automatic grinding cycle, including automatic wheel dressing at predetermined intervals. Operator simply loaded the part, reset the size handwheel and pressed the start button. Production increased to 24 parts per hour.

1960—Modern Style 39-A, today produces the same basic part but now at a rate of nearly 60 parts per hour. This powerful, versatile machine has a high-speed workhead, high-frequency Bryant Grinding Spindle, automatic loading, unloading and cycling. It requires only the part-time attention of one unskilled operator.

MMT-PE



TOMORROW—Will you have a similar long-run part, or perhaps pinions, worms, taps, thread gages, lead screws, missile components or other special parts that cannot be rough- or finish-ground economically on your present equipment?

Your local Ex-Cell-O Representative can show you how modern Ex-Cell-O Precision Thread Grinders can substantially reduce the cost of producing a wide variety of your large and small threaded parts. Call him today, or write direct for details on the complete line of Ex-Cell-O Internal, External and Universal Thread Grinders for every toolroom and production job.

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION

60-35

EX-CELL-O FOR PRECISION

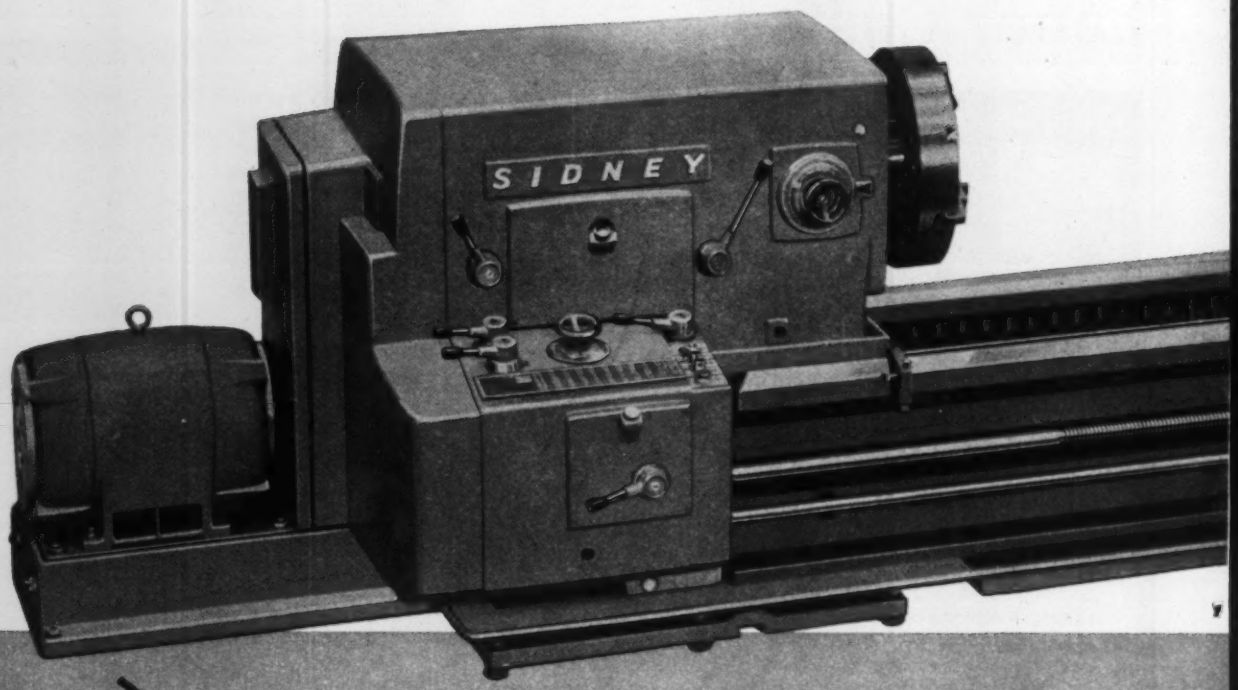
MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • DRILL JIG BUSHINGS • TORQUE ACTUATORS • CONTOUR PROJECTORS • GAGES AND GAGING EQUIPMENT • GRANITE SURFACE PLATES • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • ATOMIC ENERGY EQUIPMENT • RAILROAD PINS AND BUSHINGS • DAIRY AND OTHER PACKAGING EQUIPMENT

Machinery Division

EX-CELL-O CORPORATION

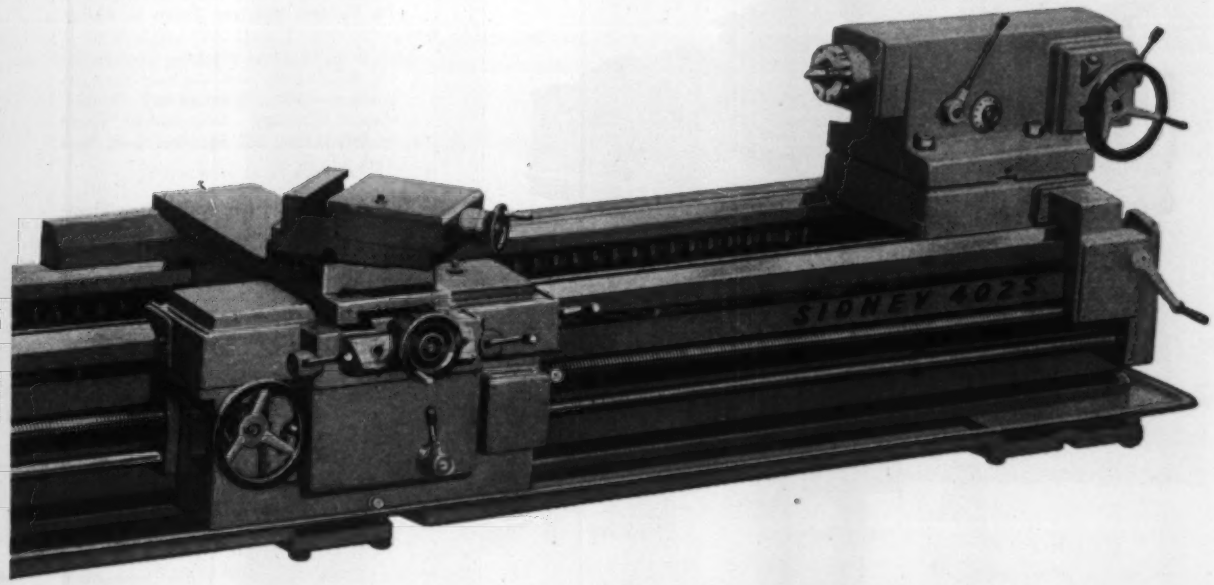
DETROIT 32, MICHIGAN

A GREAT OLD NAME



all-new SIDNEY 4025

GETS new GLORY



AN all-new LATHE FROM THE FLOOR UP

Now! From one of the most respected names in the machine tool industry comes a completely new lathe, the Sidney 4025. The extra heavy-duty 4025 is a product of Sidney's years of experience plus extensive research among lathe users to determine the features most wanted in a lathe. The result is an all-new lathe which removes metal faster, easier and at lower cost on a wide range of jobs. Here are just a few outstanding features of the new Sidney 4025:

75 HORSEPOWER IN ALL SPEED RANGES makes possible a metal removal rate of up to 180 cubic inches per minute. This extra power gets the job done faster and at lower cost.

SPEED RANGE OF 5 TO 800 R.P.M. permits the selection of a surface speed to handle a larger variety of work or materials. The Sidney 4025 can achieve a 22 to 26 micro inch surface finish.

SIMPLIFIED CONTROLS located at a convenient height for the operator provide faster, easier operation. Spindle controls consist of a single dial and shifting lever for either r.p.m. or surface speeds.

DUAL CAM TUMBLER LOCK FOR GEARBOX eliminates the possibility of gear and cone gear unlocking during exceptionally heavy feeds. Gearbox also provides 60 threads and feeds for greater versatility.

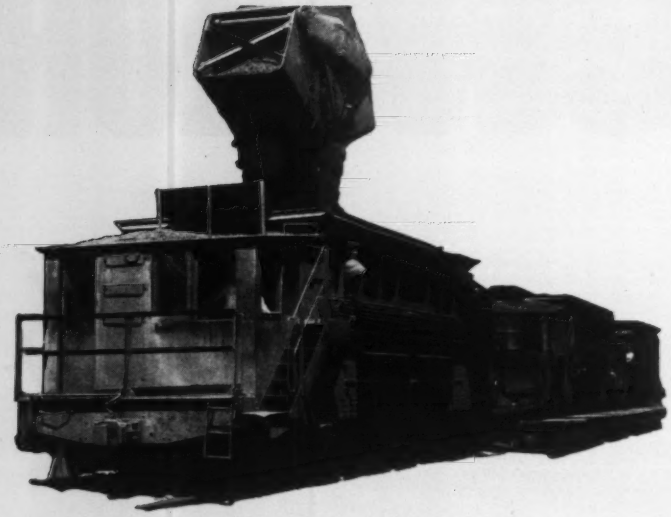
THREE DIMENSIONAL TRUSS DESIGN OF BED gives exceptional rigidity to handle the torsional load of the full 75 horsepower. The one piece bed also features replaceable hardened and ground tool steel ways.

DEPTH READING DIAL measures tailstock spindle travel to eliminate possibility of operator error. Operator-selected live or dead spindle is optional for maximum control and versatility.

PLUS... Anti-friction bearings throughout, automatic lubrication, and many other exceptional features. For complete information contact your local Sidney Distributor or write directly to:

SIDNEY MACHINE TOOL COMPANY • SIDNEY, OHIO / A WHOLLY OWNED SUBSIDIARY OF BUHR MACHINE TOOL CO.

SEE THE SIDNEY LATHES in action at the National Machine Tool Exposition, September 6 thru 16, Chicago. Booth 1440.



day in – day out
DEPENDABILITY

ATLAS

Atlas cars like the 75-ton ore transfers above are built to the individual load and schedule of each user. This custom engineering method, with matching care in manufacturing, assures dependable service incorporating all approved personnel safety features.

Since 1896 designers and builders of Ore Transfers . . . Scale Cars . . . Coke Quenchers . . . Coal Larries . . . Door Machines . . . Safety-Type Transfers . . . Storage Battery Locomotives

ATLAS CAR & MFG. COMPANY
1140 IVANHOE ROAD
CLEVELAND 10, OHIO

CALENDAR
OF MEETINGS

Sept. 3-4, American Machine Tool Distributors Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Sept. 6-16, National Machine Tool Builders' Association: The Machine Tool Exposition—1960, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 6-16, Production Engineering Show: Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 7-9, American Society of Mechanical Engineers: Instruments and regulators conference, Massachusetts Institute of Technology, Cambridge, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 7-15, Coliseum Machinery Show: Coliseum, Chicago. Information: A. Byron Perkins & Associates, 2807 Sunset Blvd., Los Angeles 26, Calif.

Sept. 12-13, Industrial Truck Association: Fall meeting, Cavalier Club, Virginia Beach, Va. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Sept. 12-15, Society of Automotive Engineers Inc.: National farm, construction, and industrial machinery meeting; production forum; and engineering display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 13-15, American Chemical Society: Fall meeting and exhibit, Statler-Hilton Hotel, New York. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 13-16, Electronic Industries Association: Fall meeting, French Lick-Sheraton Hotel, Frenck Lick, Ind. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

Sept. 14-15, American Die Casting Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 14-16, National Industrial Conference Board Inc.: General session for all associates on marketing, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

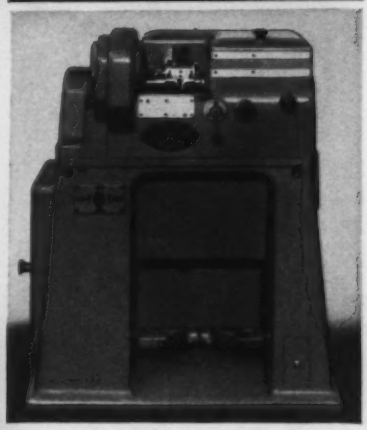
YOU *save money* by threading with CRI-DAN

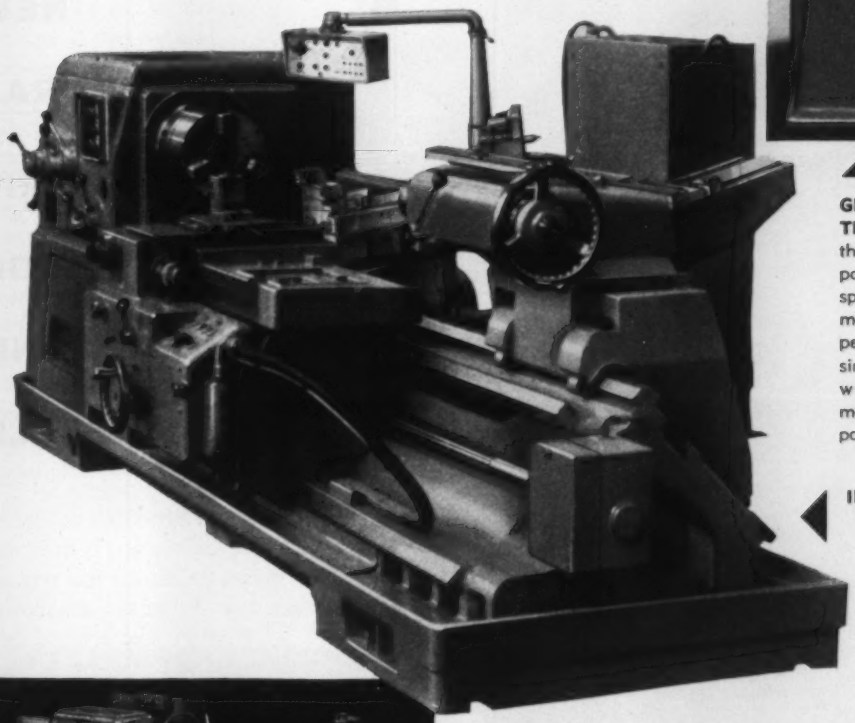
SEE for yourself the advantages CRI-DAN offers:

- Low Tooling Cost — single-point carbide tool eliminates costly taps, dies, thread milling cutters and thread grinding wheels;
- Speed — dramatic time savings through fast automatic cycle and fast, simple setup;
- Precision — all types of work and materials — single- and multiple-start, coarse or fine, straight or tapered, left- or right-hand, internal or external — right up to shoulders.

GISHOLT BOOTH 518

second coliseum machinery show





GISHOLT CRI-DAN A Threading Lathe — for threading small precision parts at peak production speeds. The carbide tool makes up to 150 passes per minute! The operator simply loads and unloads work, controlling the machine from a sitting position.

INTRODUCING—the GISHOLT CRI-DAN FT-80 Threading and Turning Lathe

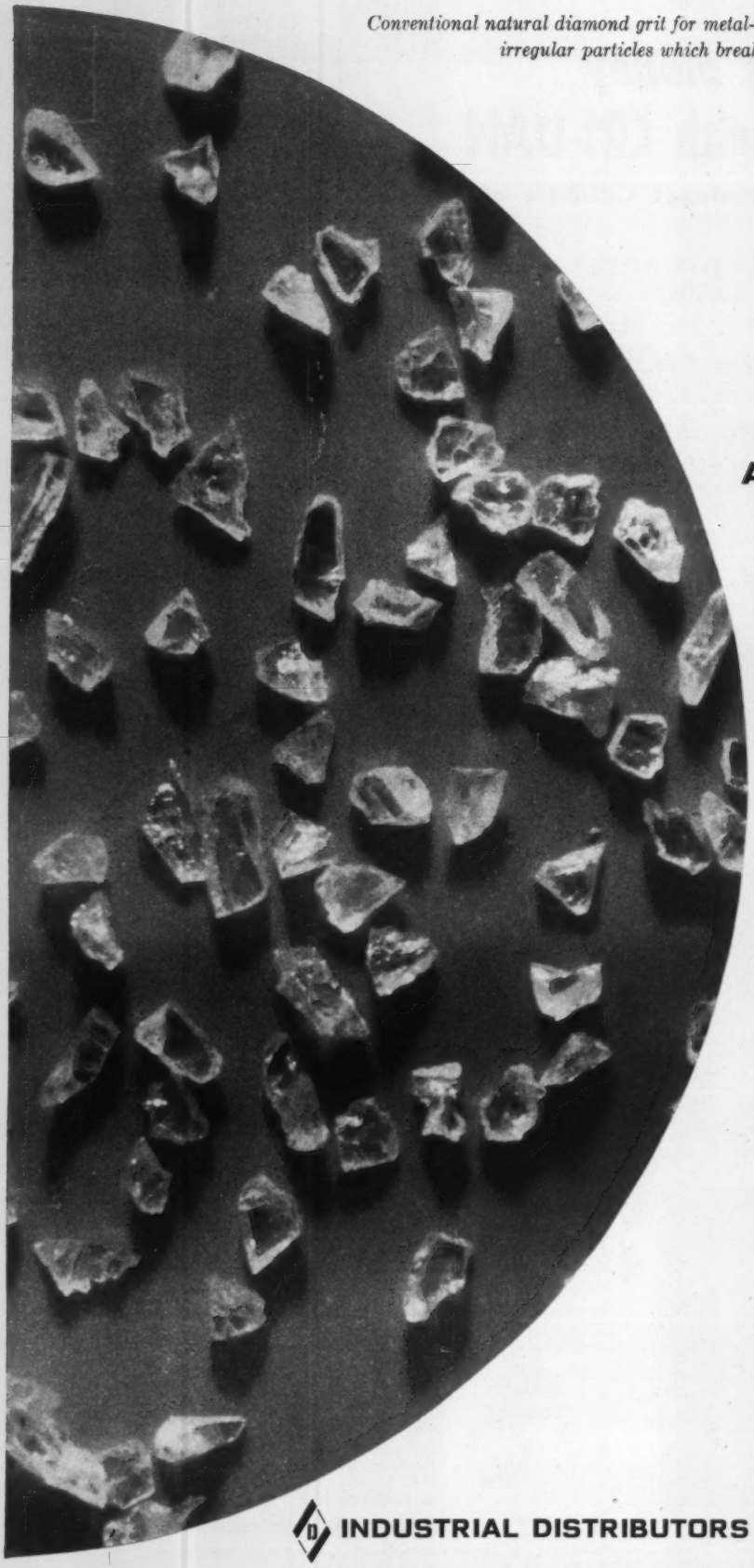
For the first time see one machine perform threading, turning, facing, boring, tracing and cut-off, using single-point carbide tools throughout, in one fast automatic cycle.

GISHOLT CRI-DAN B Threading Lathe — demonstrates 15-minute setup; threading and tracing of high-tensile bolts and related parts; versatility for all types of work and materials at production rates far above those possible with thread milling or thread grinding.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers (R) • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

Conventional natural diamond grit for metal-bond wheels and saws. Note the friable irregular particles which break down under heavy pressure grinding.



ANNOUNCEMENT:

NEW

NATURAL

DIAMOND GRIT

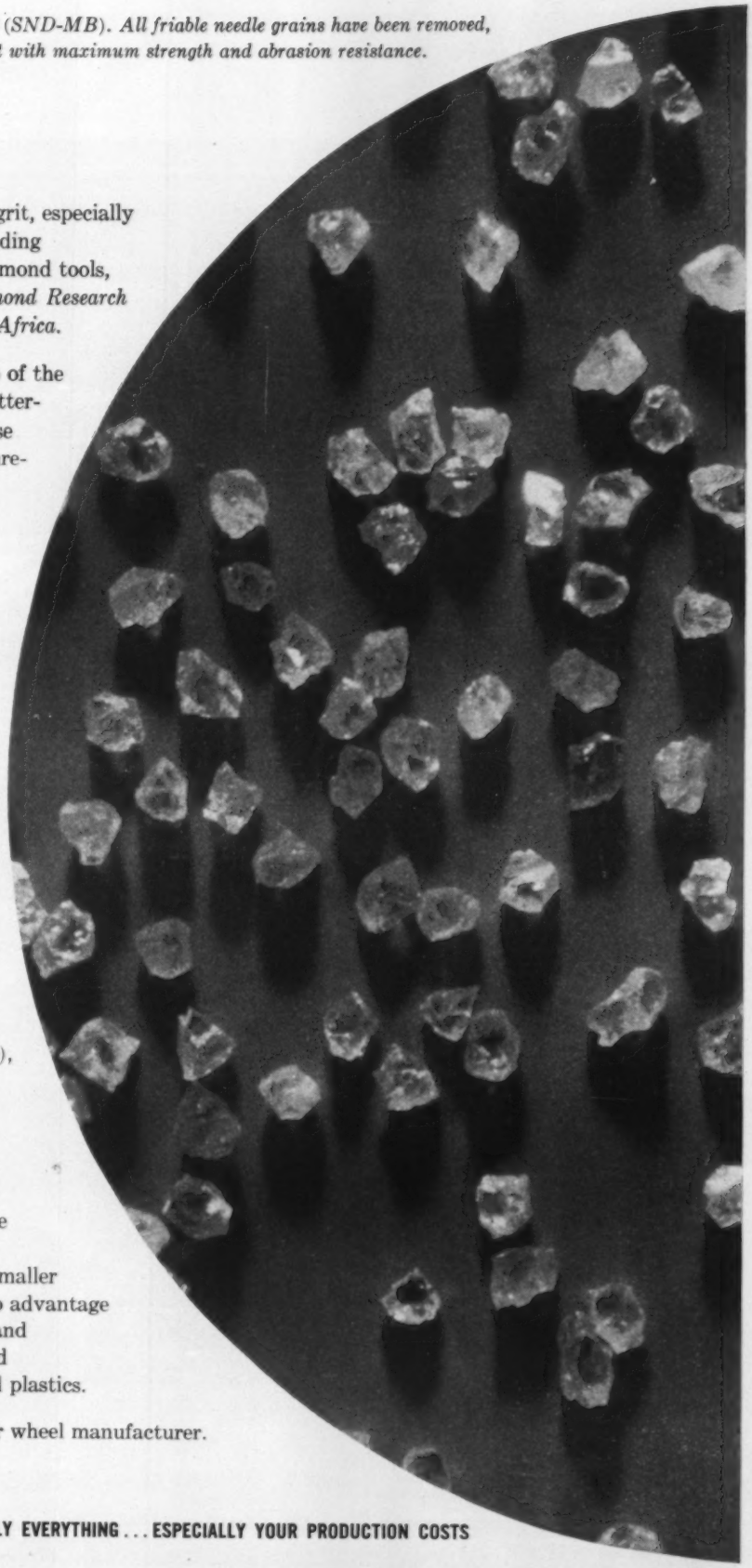
FOR

METAL-BOND

WHEELS

INDUSTRIAL DISTRIBUTORS (SALES), LTD., *London*

New Selected Natural Diamond Grit (SND-MB). All friable needle grains have been removed, leaving only the blocky, cube-like grit with maximum strength and abrasion resistance.



A new type of natural diamond grit, especially suited for use in metal-bond grinding wheels and other metal-bond diamond tools, has been developed at the *Diamond Research Laboratory, Johannesburg, South Africa.*

This new natural grit is made up of the strongest, most abrasion and shatter-resistant diamond particles for use in metal matrixes. A new pressure-testing and selecting process removes friable particles from the grit. Thus, the inherent strength of the natural diamond particle is ideally presented for the heavy-duty cutting done with metal-bond wheels and saws.

The new grit has been found stronger than any diamond grit available to date. In tests with concrete, marble, and tile, the new grit permitted a 30 to 50 per cent faster cutting rate than was previously possible. Further tests are under way in actual production set-ups.

Known as SND-MB (SELECTED NATURAL DIAMOND-METAL BOND), the new grit will be offered in a production range of mesh sizes from Tyler screen 16 to 325 mesh at present. The larger sizes will be used in metal-bond saws and thin-wall core drills, which are used in cutting concrete, stone and other rugged materials. The smaller cube-like diamonds will be used to advantage in metal-bond wheels for cutting and grinding of materials like glass and ultra-hard ceramics and reinforced plastics.

SND-MB is now available to your wheel manufacturer. Ask him about it.

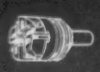
INDUSTRIAL DIAMONDS CUT PRACTICALLY EVERYTHING . . . ESPECIALLY YOUR PRODUCTION COSTS

Threading Machines

Taps—Collapsible & Solid Adjustable

Centerless Thread Grinding Machines

Thread Rolling Machines



Die Heads—Rotary & Stationary

Thread Rolling Tools

THIS THREAD ROLLING OPERATION

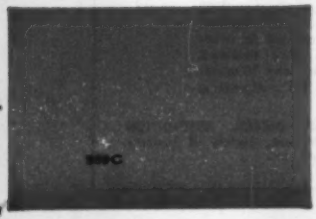
will come to life at MMT=PE booth 432

The Thread Rolling operation illustrated here, and a series of other threading operations, will be demonstrated by the Landis Machine Company in Booth 432 at the Machine Tool Exposition. At the booth you will get a close first-hand look at how Thread Rolling has proved to be beneficial in many ways to a growing number of users.

You will see demonstrated on the LANHYROL and LAN-NU-ROL Thread Rolling Machines: ❶ Infeed Rolling that reduced overall cost by 80%; ❷ Continuous Knurling and Rolling in one spindle revolution; ❸ Reciprocal Rolling of large diameters; ❹ Automatic Infeed Rolling of involute splines; ❺ Roll-straightening of double-end studs; ❻ Continuous Rolling of extra long threads; ❼ Automatic Thrufeed Rolling; ❽ High Production Infeed Rolling; ❾ Infeed Rolling of large diameter double-end studs; ❿ Automated Infeed Rolling.

TAPPING and CUTTING operations will also be demonstrated on the Coupling Tapping Machine, the 4-Spindle Semi-Automatic, and various models of the LANDMACO Threading Machine. These include: (1) Automatically tapping threads in external upset tubing couplings; (2) Cutting threads on insulator pins at a high production rate; (3) Cutting large diameter threads; (4) Cutting threads on close nipples automatically; (5) Cutting threads with an automated LANDMACO Threading Machine.

In addition, the complete line of Die Heads, Taps, Thread Rolling Attachments and Thread Rolling Heads will be displayed. Experienced LANDIS engineers will be available to discuss any problem dealing with method, equipment, or thread design.

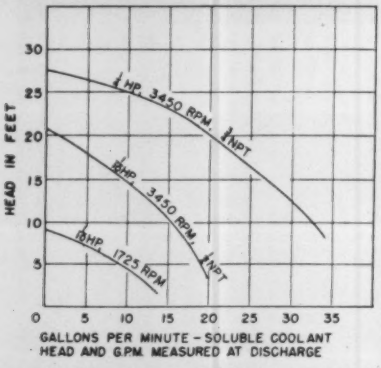


LANDIS *Machine* COMPANY

WAYNESBORO, PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

FOR MORE COOLANT PUMP ECONOMY*



*Performance Chart

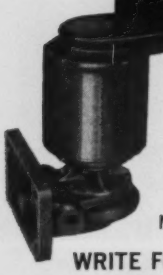
Gusher
Sealess-Type

Gusher flange mounted coolant pumps feature a simple design with no seals, no packing or priming necessary. They are designed to mount on the side of the reservoirs with either external or internal discharge. Immersed type also available.

Model 5-P

See Our Booth #376 Chicago Production Eng. Show

RUMACO
Seal Type



Rumaco pumps are seal type, centrifugal pumps that can be mounted in any convenient place. Precision built, Rumaco pumps give efficient, trouble-free operation. Seals are the best obtainable.

Model 5-S

WRITE FOR FURTHER INFORMATION TODAY

THE Ruthman MACHINERY CO.

- COOLANT PUMPS
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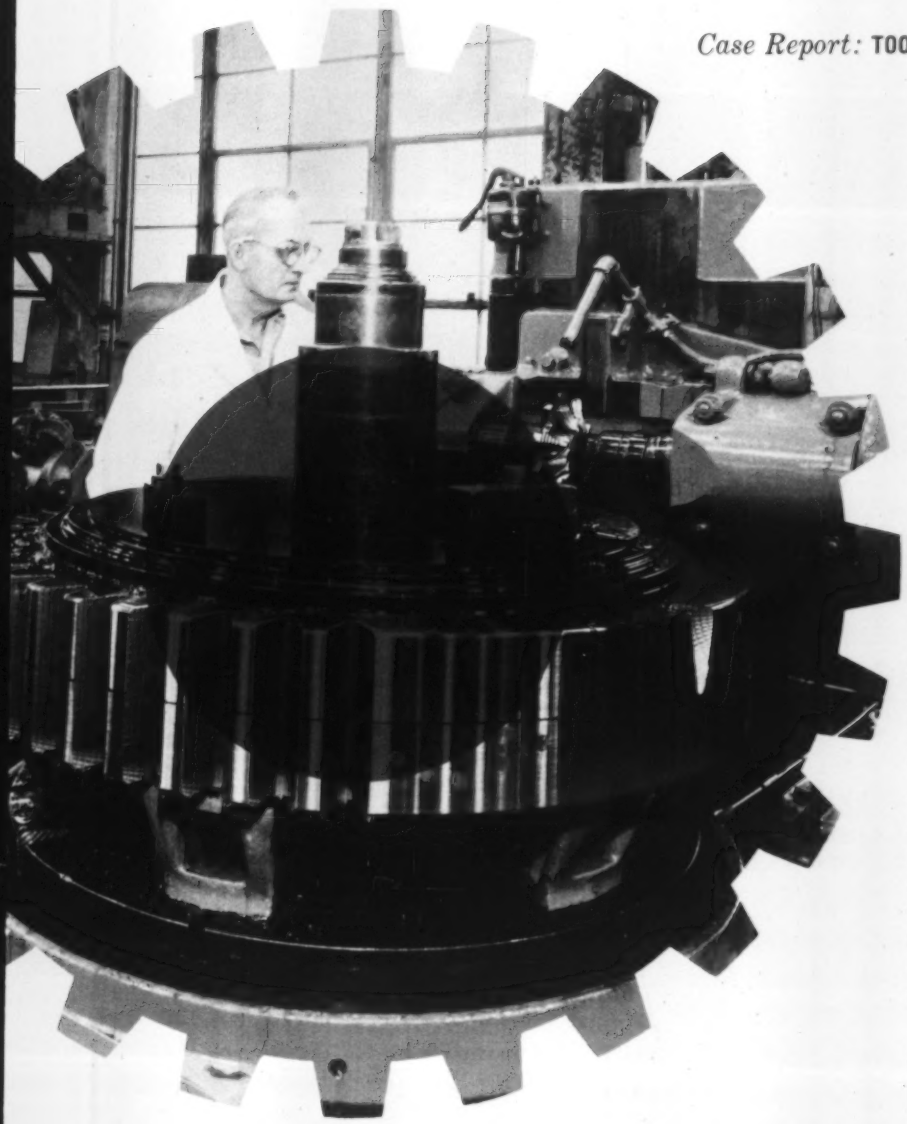
USERS PROVE ALCO HI-QUA-LED STEEL FORGINGS CUT MACHINING COSTS UP TO 50%



Case Report: **TOOL STEEL GEAR & PINION CO.**

Hi-Qua-Led Forgings
Cut Machine Time 45%

The Tool Steel Gear & Pinion Co., Cincinnati, achieves large savings in gear-machining operations with ALCO's Hi-Qua-Led Steel forged and rolled rings. On one gear ring, for example, Tool Steel reduced turning time 22% before hardening, and 42 % after hardening. Gear hobbing time was cut 43%, rebore 45% and key seating 50%. Average time reduction was 45%.

Hi-Qua-Led forgings machine this easily because of a lead additive which increases shear angle and reduces tool friction. Result: heavier cuts and higher cutting speeds. Expensive tooling lasts longer—five, 10, even 100 times longer.

These big savings are only part of the story. Because Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade, Tool Steel can stand squarely behind its unique guarantee: "Any deficiency made good by cash or new materials."

ALCO

Case Report: **WARNER & SWASEY CO.**

Increased Capacity with
No Additional Investment

Warner & Swasey Co., Cleveland, uses Hi-Qua-Led open-die forged bars for the pentagon-shaped tool holders in their 2AC and 3AC automatic chucking machines. It adopted Hi-Qua-Led for this job three years ago, because it found that machining speeds on every operation—turning, milling, sawing, trepanning, grinding and drilling—could be increased by at least 50%.

The decrease in machining *time* Warner & Swasey gets is about 3 hours per forging. This compensates for the extra cost of Hi-Qua-Led. But Warner & Swasey reasons that Hi-Qua-Led actually expands its production capacity, without any added investment in factory or tools. This is worth about $60 per forging, according to Warner & Swasey figures.

ALCO

Case Report: LUFKIN FOUNDRY & MACHINE COMPANY

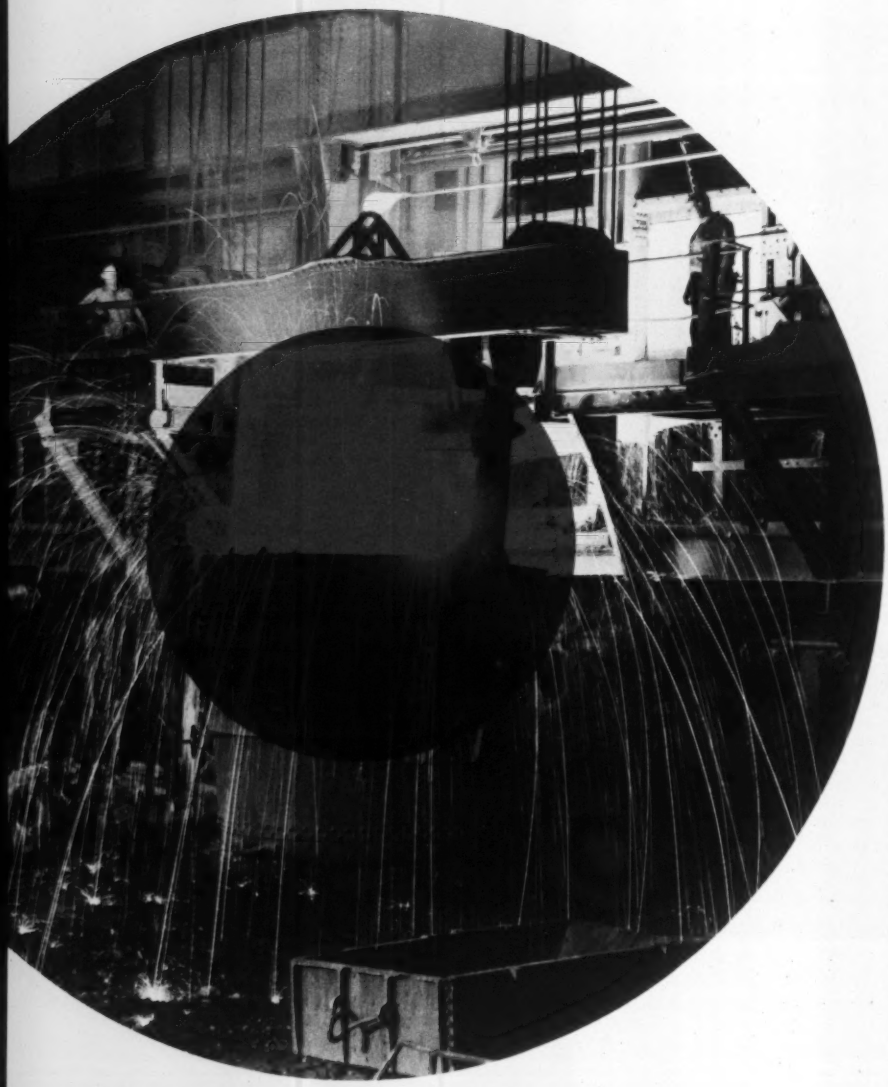
Higher Quality Gears for the Same Cost

Lufkin Foundry & Machine Co., Lufkin, Tex., uses Hi-Qua-Led forged and rolled rings for 60 in. diam. herringbone gears in its large oil-well pumping units. Previously, cast rings had been used.

Lufkin F&M finds that, although the Hi-Qua-Led rings' price is higher, their machinability cuts the cost of the finished fabricated gear to that of the cast gear. Lufkin is thus able to put a better, more uniform gear in its pumping units for the same cost and provide improved equipment and higher value to its customers.

The table below shows how Hi-Qua-Led rings reduced machining costs at Lufkin F&M.

HI-QUA-LED RING vs CAST RING			
OPERATION	**CASTING**	**HI-QUA-LED**	**HI-QUA-LED SAVINGS**
Turning	20 hours	8.1 hours	59.5%
Shape Teeth	80 hours	60 hours	25%
Tool Expense	$75.00	$25.00	67%



ALCO HI-QUA-LED STEEL FORGINGS RAISE PROFIT WITHOUT LOWERING QUALITY

While lowering machining costs, ALCO Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade. "In use" tests show that tensile strength, impact, fatigue and other properties are unchanged. Further, ALCO's exclusive patented lead-addition process guards against lead inclusions or segregates. You get the high quality you expect in custom-forged material.

Hi-Qua-Led Steel rings and forgings are furnished in any steel analysis. If you wish, ALCO will make up your order of regular forgings and include in it a Hi-Qua-Led forging, at no extra cost, for ALCO-supervised tests in your own plant. ALCO Products, Inc., Dept. 1501, Schenectady 5, N.Y.

SIZES AVAILABLE

OPEN DIE FORGINGS — RECTANGULAR
Maximum width — 32 in.
Maximum height — 32 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

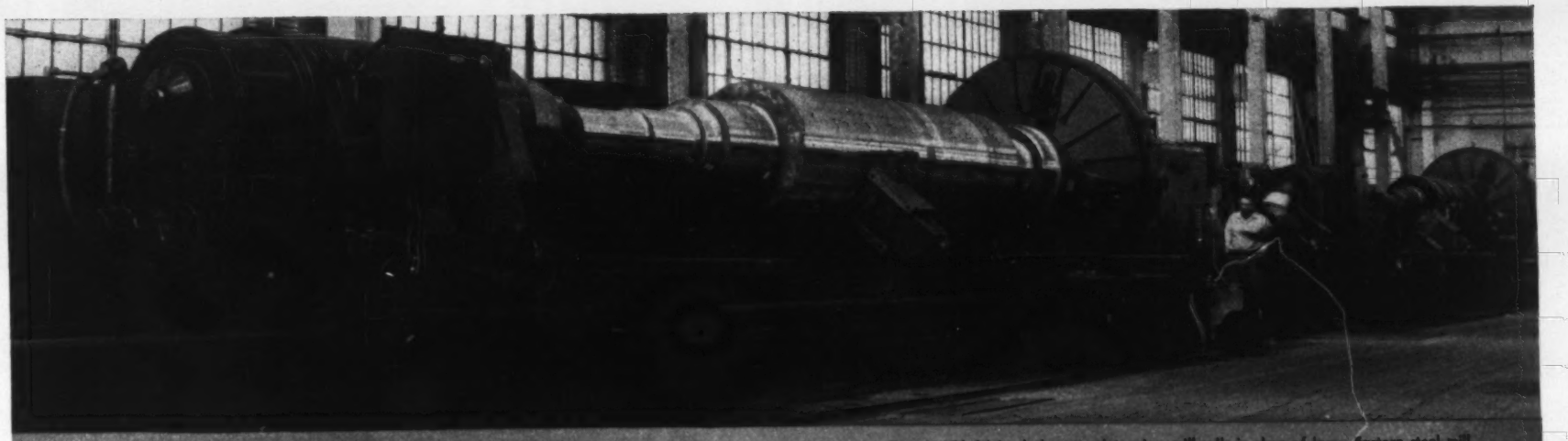
MANDRELLED RING FORGINGS
Maximum OD — 82 in.
Minimum OD — 24 in.
Maximum width — 60 in.

OPEN-DIE FORGINGS — ROUNDS
Maximum OD — 36 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

ROLLED RING FORGINGS
Maximum OD — 160 in.
Minimum OD — 18 in.
Maximum width — 24 in.

ALCO FORGINGS

ALCO PRODUCTS, INC.



Two NILES 84 in. lathes rough-turning mill rolls in shop of large Eastern steel mill. Powered by 200 hp motors, these machines can handle pieces up to 46 ft. long.

When BIG pieces need PRECISION turning NILES means PRODUCTION

For more than a century the NILES nameplate has been affixed to fine production machine tools, including some of the largest lathes and turning machines built in this country. This experience, continuously upgraded by unrelenting research and modern technology, has resulted in the design and manufacture of lathes with largest capacity and with versatility to handle jobs requiring precision turning of the highest order. Features of the above NILES Lathes, all built for exacting workmanship on big pieces, include:

- Five hardened and ground steel ways supported by a box-section longitudinally and cross-supports cast integral with the bed. All carriage-way mating surfaces with bronze liners.
- Headstock with a straight face-plate drive and two ranges of spindle speeds: low, 1-20 rpm; high, 20-80 rpm. Spindle speeds infinitely variable within each range.
- Tailstock antifriction live center which can be locked against rotation and used as dead center. Tailstock quill is hydraulically springloaded and adjustable to suit load conditions and allow for linear expansion of the workpiece.
- Modern electronic feeds permit variable feed rates. Mechanical feeds are provided for thread cutting.
- Taper attachment is adjustable longitudinally by means of gearmotor engagement of rack and can be used independently with any carriage.

For fast, accurate turning, boring, milling or planing, turn to NILES. Lathes in sizes from 50 in., boring mills from 14 ft., planers and planer-mills from 10 ft. Expanded facilities at our new Industrial Equipment Division assure finest workmanship and good deliveries. Write Dept. MT.

You don't baby a NILES—it's no baby

BALDWIN · LIMA · HAMILTON

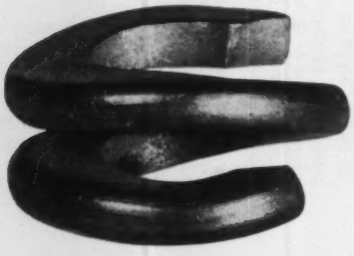
Industrial Equipment Division, Philadelphia 42, Pa.

BALDWIN BLH LIMA HAMILTON

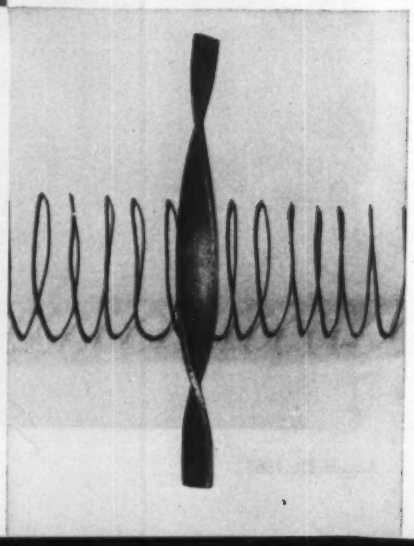
SEE US AT BOOTH 1226,
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION

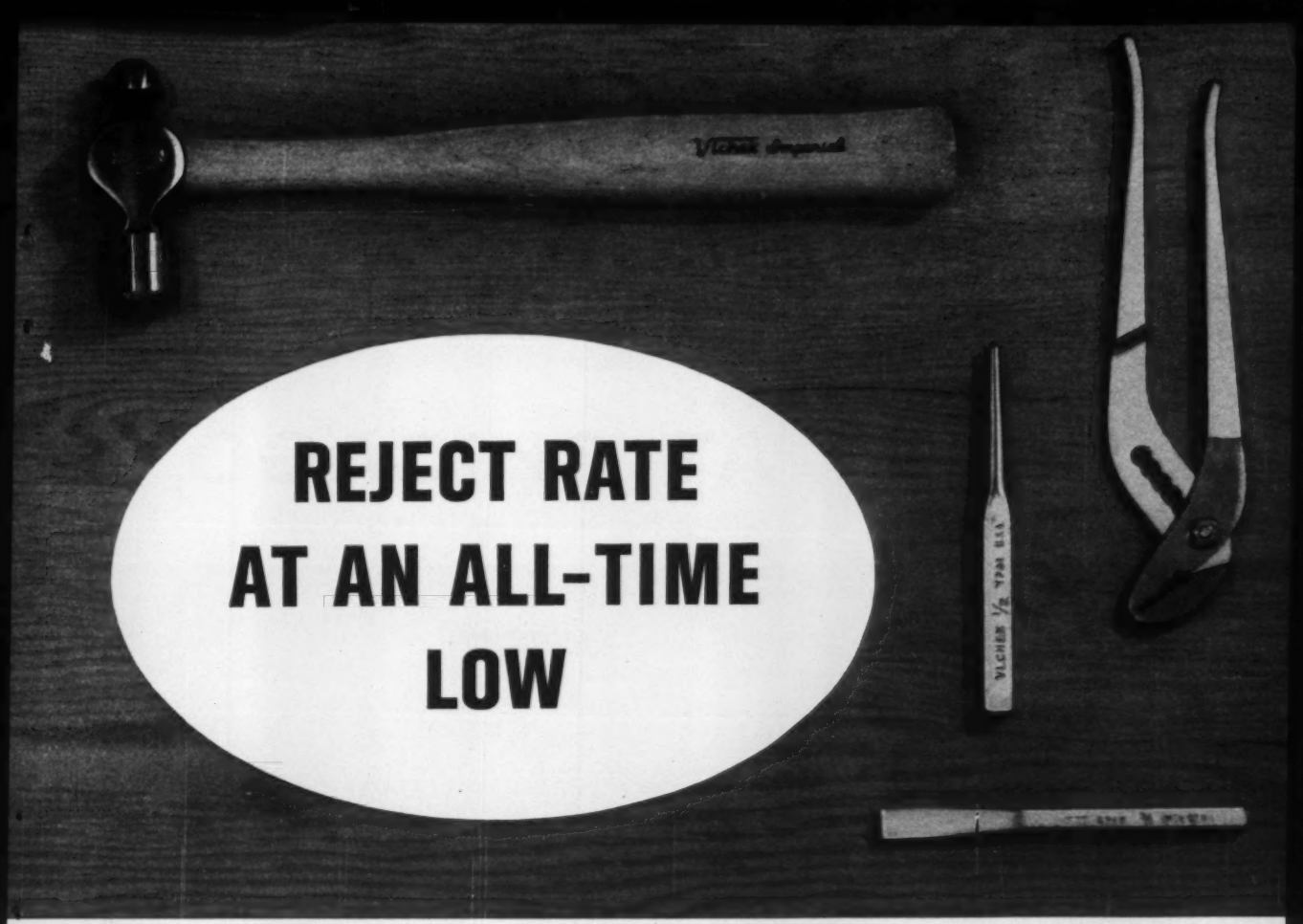
EXCELSIOR FOUNDRY COMPANY profits from the ductility and machinability of Republic's Chateaugay Pig Iron. Superior ductile iron castings are assured by the base metal's high total carbon content with unusually low percentages of manganese, phosphorus, sulphur, and subversive elements. Excelsior produces flaw-free castings that are accurate to patterns and shapes. Return coupon for data.

CHOICE VEND DIVISION, The Seeburg Corporation, uses Republic Electro Paintlok Steel Sheets for exterior panels on soft drink vending machines. Paintlok Sheets are ideally suited for this service. They are zinc coated by the electrolytic process and chemically treated at the mill to provide an inert phosphate base for paint, lacquer, or enamel. Final finish is held in a permanent mechanical bond. Sheets available in widths to 60 inches, thicknesses from .0088 to .1083.



EATON MANUFACTURING COMPANY, Reliance Division, draws Republic Hot Rolled Alloy Steel into lock washers for railroad track joints. These washers minimize rail movement yet are resilient enough to prevent frozen joints. The high quality of Republic Alloy Steel helps assure conformance to American Railroad Association specifications. At the same time, it has minimized scrap loss.





REJECT RATE AT AN ALL-TIME LOW

...Vlchek uses Republic Carbon Steel

A high volume manufacturer, Vlchek Tool Company, Cleveland, Ohio, has been producing quality mechanics' tools since 1895.

They forge three top grades of Republic Hot Rolled Carbon Steel—C-1040, C-1068, and C-1080—into pliers, end wrenches, chisels, punches, hammers, and other tools. Reject rate, according to Vlchek, is at an all-time low.

Republic combines unsurpassed quality control with the most advanced features of bar mill design. As the nation's largest supplier of forging quality carbon, alloy, and stainless steels, and forging quality titanium, Republic offers a complete range of sizes, shapes, and types.

Information on Republic bar products is available from your nearby Republic representative. Or, use the coupon below. You may wish to inquire into the obligation-free assistance offered by Republic's 3-Dimensional Metallurgical Teams.

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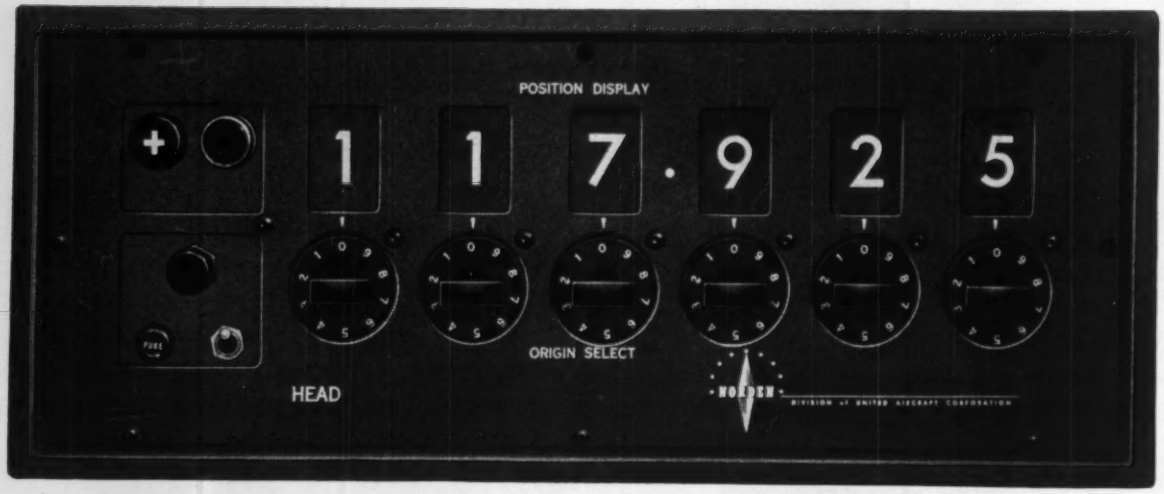


Modumatic Systems Control–Display

MEASUREMENT • POSITION • INSPECTION

NORDEN DIVISION

Norden Division of United Aircraft Corporation presents advanced but simple systems applicable to your need for faster, more accurate positioning of tool or workpiece

Norden Modumatic Systems feature readout of actual position, automatic positioning, full range origin select, and controlled programing

FOR MEASUREMENT

Series 100—This system displays in straight decimal form the exact position of the tool or workpiece. One display is used for each axis of motion.

Features—Illuminated numbers, readable from twenty feet—individual plug-in decimal units—display unit can be located on machine or remote.

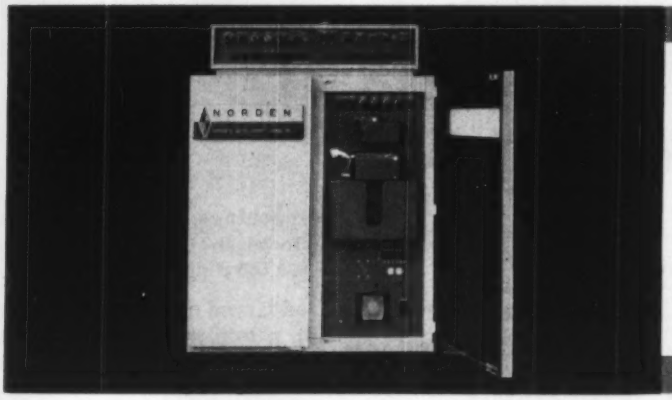
FOR POSITIONING

Series 600—A completely automatic positioning system with input from either manual dial-in switches or punched tape. Display units provide decimal readout of actual position—not command.

FOR INSPECTION

This new Norden concept now makes possible automatic inspection of parts by measuring their exact shape and contour. Since each point on the part's surface has a digital value this information can be easily programmed. Corresponding points on the actual part can be probed automatically and their dimensions compared with the programmed information. The system can be provided with direct numeric print or readout of actual dimensions, deviations from nominal, or out of tolerance indications. In addition, punched tape output is available.

Norden numerical control systems also offer full range electronic origin select. This allows any desired offset to be quickly and easily dialed in by the operator on manual selector switches. In addition, these systems are available with automatic tape punch units for tape preparation "on the machine." This provides a permanent inspection record or a programmed tape for playback applications.



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PRODUCTION ENGINEERING SHOW, NAVY PIER SEE US AT BOOTH 221.
At the National Machine Tool Builders Show see Norden Controlled Machines exhibited by G. A. Gray Company, Booth 1350. Atlantic Machine Tool Works, Booth 543. LaPointe Machine Tool Company, Booth 1229.

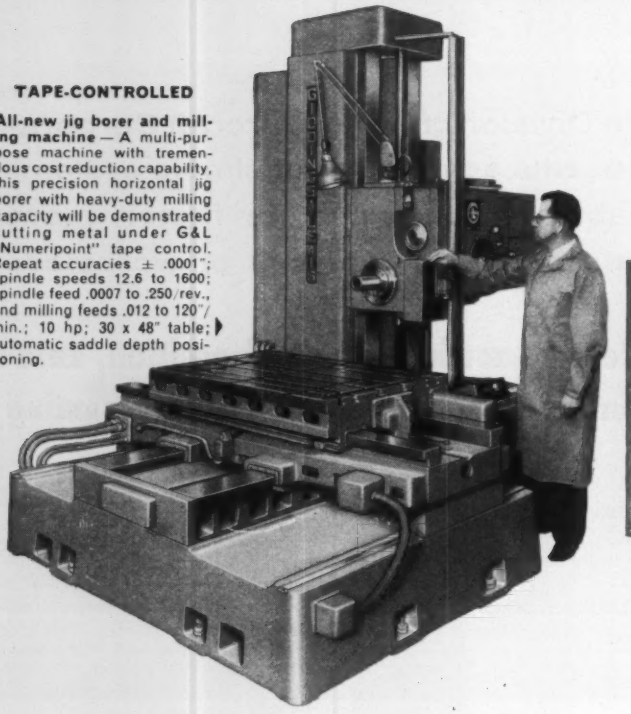
For more information contact your nearest Norden Representative. 400 Main Street, E. Hartford, Connecticut, JAckson 8-4811. 11 West Monument Avenue, Dayton 2, Ohio, BAldwin 8-4481, or write us at the address below.

OF UNITED AIRCRAFT CORPORATION
DATA SYSTEMS DEPARTMENT
SANTA ANA, CALIFORNIA

MMT=PE

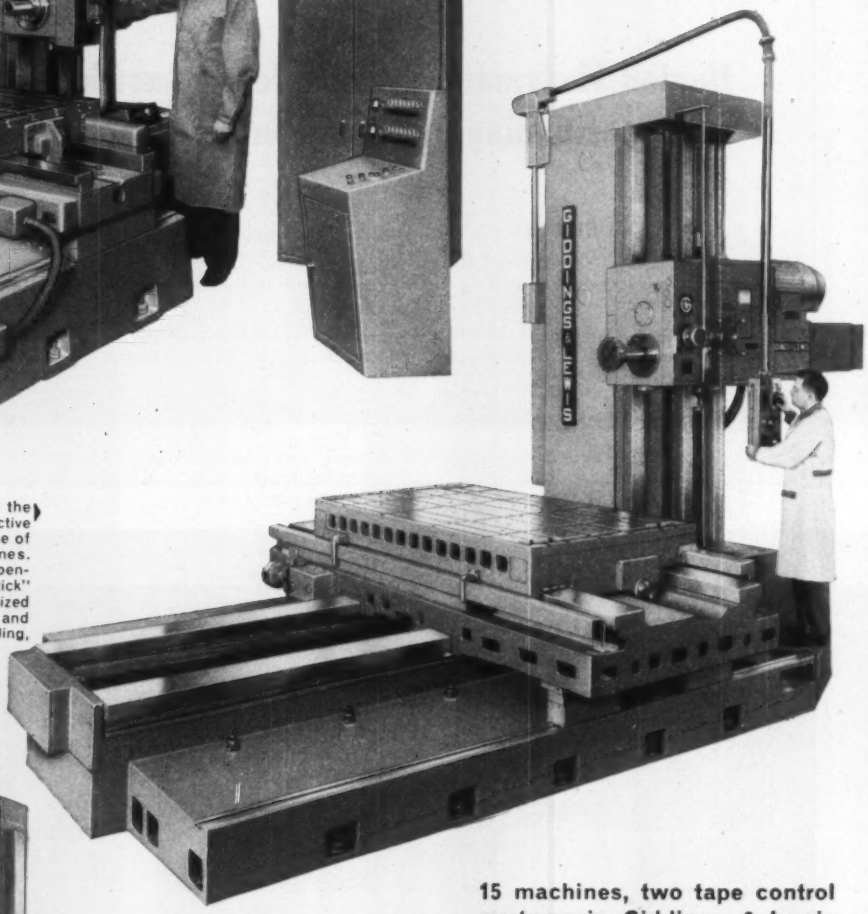
TAPE-CONTROLLED

All-new jig borer and milling machine — A multi-purpose machine with tremendous cost reduction capability, this precision horizontal jig borer with heavy-duty milling capacity will be demonstrated cutting metal under G&L "Numeripoint" tape control. Repeat accuracies ± .0001"; spindle speeds 12.6 to 1600; spindle feed .0007 to .250/rev., and milling feeds .012 to 120"/min.; 10 hp; 30 x 48" table; automatic saddle depth positioning.



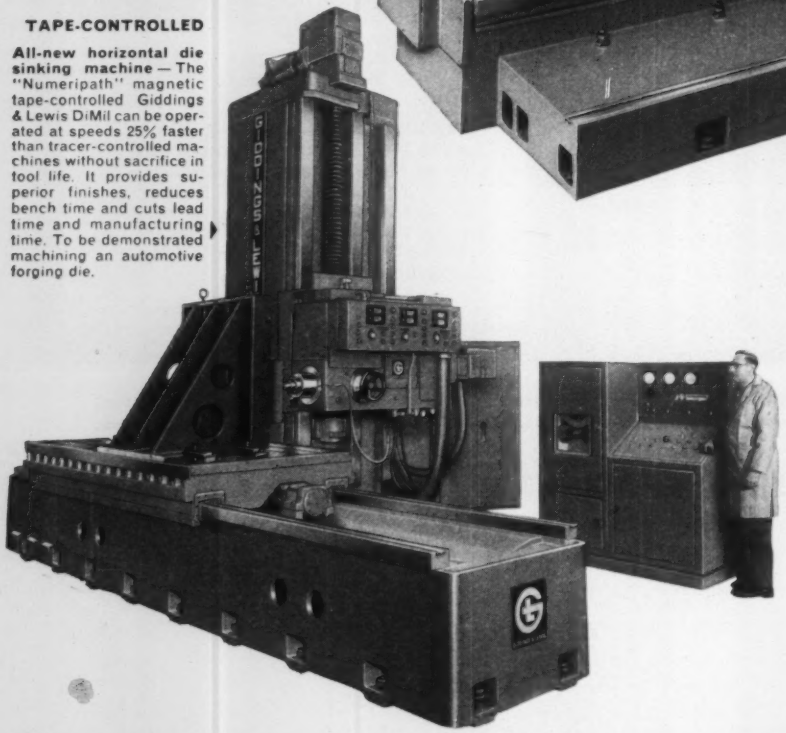
TAPE-CONTROLLED

All-new table-type horizontal built with the power and rigidity to make it the most productive machine in the history of the world's leading line of horizontal boring, drilling, and milling machines. Dozens of advanced features include complete pendant control of every machine function, "joy-stick" control of milling feeds, 3-way column, motorized headstock, independent and combination saddle and spindle feeds. To be demonstrated boring, drilling, and milling under "Numeripoint" control.



TAPE-CONTROLLED

All-new horizontal die sinking machine — The "Numeripath" magnetic tape-controlled Giddings & Lewis DiMil can be operated at speeds 25% faster than tracer-controlled machines without sacrifice in tool life. It provides superior finishes, reduces bench time and cuts lead time and manufacturing time. To be demonstrated machining an automotive forging die.



15 machines, two tape control systems in Giddings & Lewis $1,000,000 display

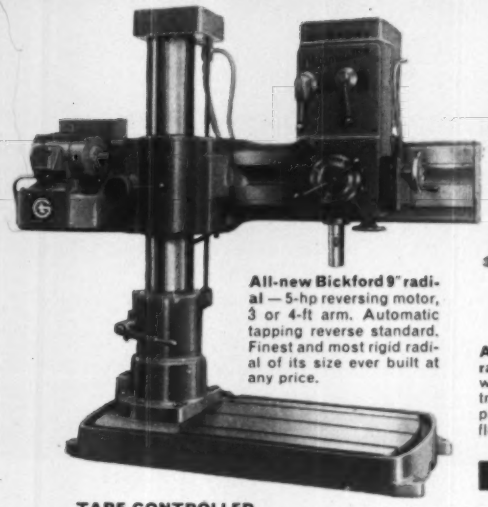
15 advanced design machine tools with a total worth of more than $1,000,000 will be exhibited by Giddings & Lewis at the Machine Tool Exposition. All machines will be under power, five operated by G&L "Numeripoint" punched paper tape control, and one under G&L "Numeripath" magnetic tape path control. 12 machines will be cutting metal.

The capabilities of this equipment as compared to that built just a few years ago are almost unbelievable. Make a note now to see them in action!

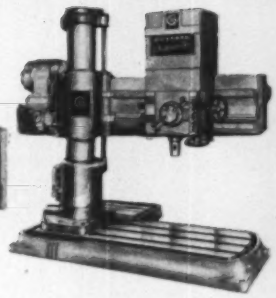
Ad No. GL-100

"Numeripoint," "Numeripath," and "DiMil" are Giddings & Lewis trade-marks.

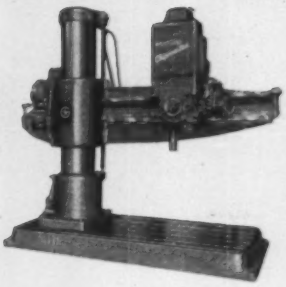
AT BOOTH NO. 1320!



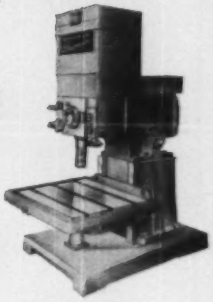
All-new Bickford 9" radial — 5-hp reversing motor, 3 or 4-ft arm. Automatic tapping reverse standard. Finest and most rigid radial of its size ever built at any price.



All-new 10-hp 11" Bickford radial — New heavy-duty head with pushbutton spindle control enables the operator to put more finished parts on floor.



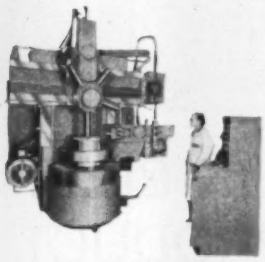
Heavy-duty 15" and 19" Bickford radials — The exclusive capabilities of these machines will be demonstrated by tapping Class 3 threads, drilling 3" holes at .100" feed/rpm!



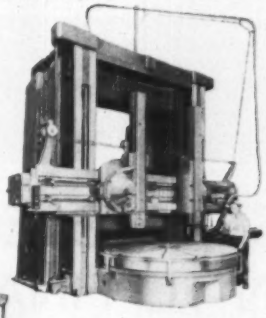
All-new Bickford 30" upright drill —This versatile 10-hp machine is a totally new concept in fast precision equipment for production and layout drilling. Features pushbutton operation.

TAPE-CONTROLLED

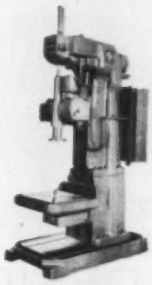
42" vertical turret lathe — An original G&L development that brings revolutionary economies to automatic small-lot machining. Table speeds, feeds, the five tools in turret head and four in side head are positioned by tape.



8-ft heavy-duty vertical boring mill— with full pendant control, roller bearing table track, and electronic readout measuring system. Operates continuously at carbide and ceramic tool speeds without loss of accuracy.

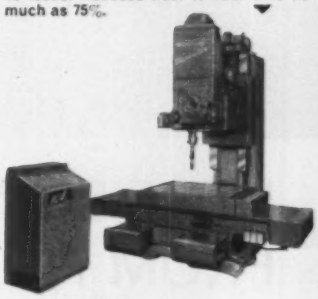


New 28" Bickford automatic cycling drill — A wide range of speeds and feeds in combination with automatic cycling and pushbutton control make this machine an outstanding producer on small lots or long runs.



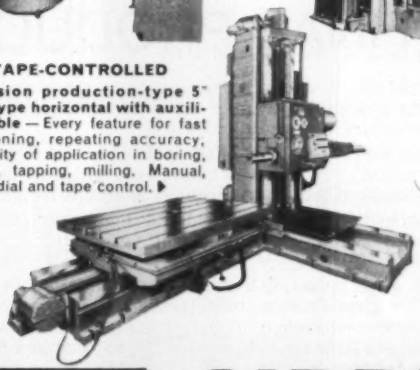
TAPE-CONTROLLED

New high-speed positioning table and precision drilling machine — 360"/min 38" x 50" table with 5-ton capacity positions to ± .001", repeats to ± .0005". Drill features full preselection of 36 speeds, 18 feeds. Reduces floor-to-floor time as much as 75%.

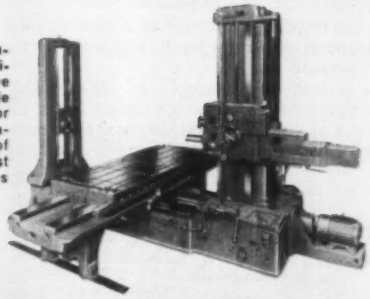


TAPE-CONTROLLED

Precision production-type 5" floor-type horizontal with auxiliary table — Every feature for fast positioning, repeating accuracy, versatility of application in boring, drilling, tapping, milling. Manual, digital dial and tape control.



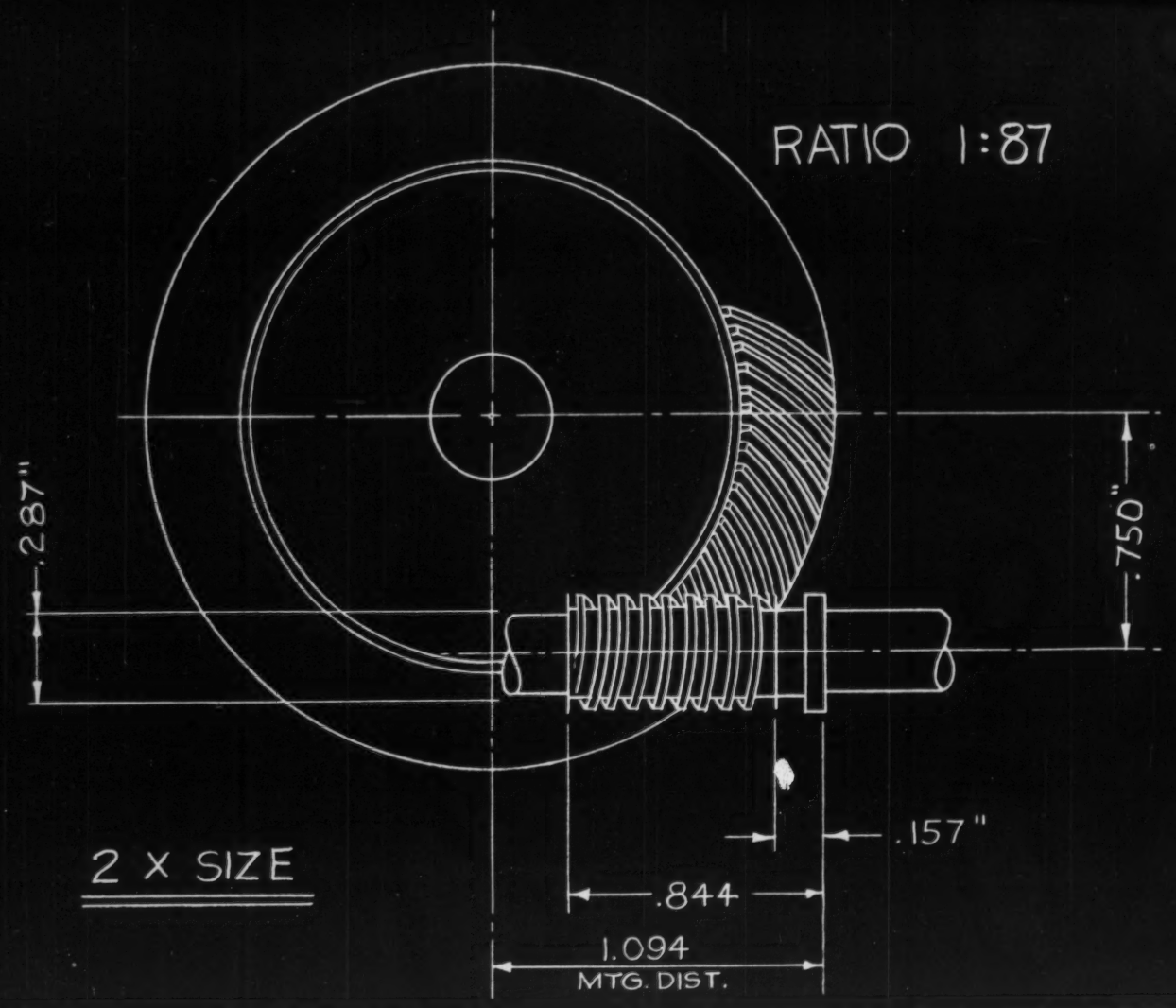
A new simplified manufacturing-type 4" horizontal featuring exclusive new zero positioning scale and many other items for operating ease and versatility that make it one of the fastest and easiest machines to run that has ever been built.



GIDDINGS & LEWIS

GIDDINGS & LEWIS MACHINE TOOL COMPANY, Fond du Lac, Wis.

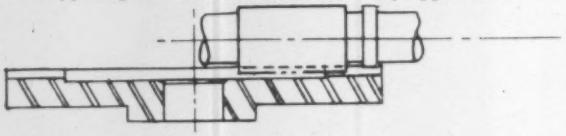
Jig borer and milling machines; horizontal boring, drilling, and milling machines; vertical turret lathes; vertical boring mills; positioning tables; die sinking machines; contour milling machines; radial and upright drilling machines; planers; planer mills; numerical and tracer control systems; Davis boring tools.



HERE'S ANOTHER GEAR GLEASON BUILT FROM FIRST DESIGN TO FINAL PRODUCT

This is the finished prototype of a new high-ratio hypoid gear. Our customer will now produce it, royalty free, on his Gleason equipment.

This is but one example of what Gleason engineering service can do for people who need gears. Our facilities and advice are at your constant disposal for development of bevel and hypoid gears to meet the needs of any application.



This particular high-ratio pair (actual size shown in insert) offers several advantages over conventional gears:

GREATER STRENGTH. High-ratio hypoid pinions are larger and stronger than corresponding bevel pinions.

COMPACTNESS. Where space is a problem, the high-offset principle lets you design a more compact and flexible unit than the corresponding worm and wheel.

SMOOTHER ACTION. High-offset pairs provide smooth, quiet tooth action . . . *continuous* action even with only one or two teeth, because of the way the teeth wrap around the pinion.

STRADDLE MOUNTINGS. Cylindrical high-ratio pinions, with extended shank, make practical very rigid straddle mountings.

GRINDING. High reduction hypoids are cut on same Gleason equipment used on familiar bevel and hypoid gears. Same testers, quenchers and other auxiliary equipment can be used. Grinders are available for the ultimate in precision and finish to minimize friction.

LET GLEASON MAKE RECOMMENDATIONS. Send along a set of prints, and we'll be glad to study them and give you our thoughts on how best to make the gears you need.

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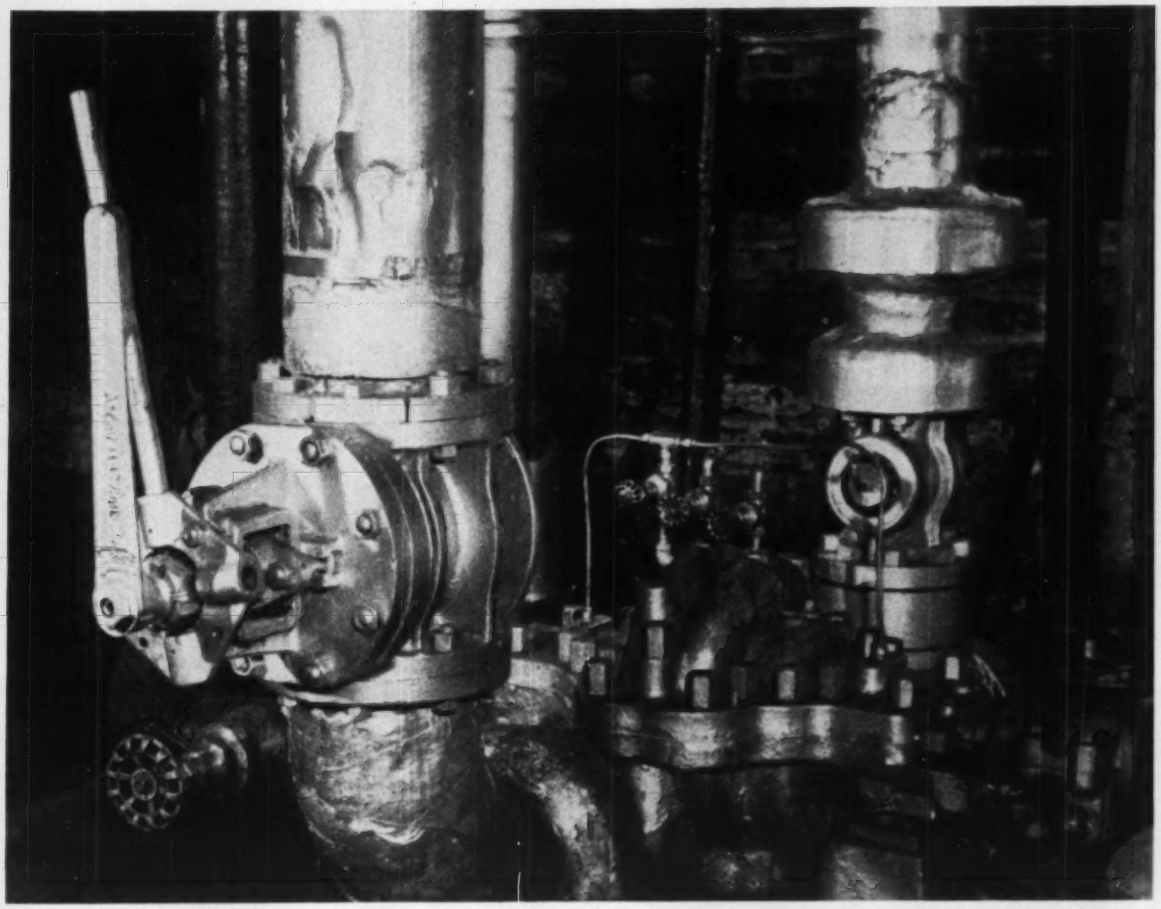

temperature, pressure and fluid conditions. It also guarantees added protection to the sealing surfaces and longer life, because the plug is firmly seated in the body in either open, closed, or throttle positions. And Homestead's straight line flow of fluid minimizes pressure drop. For extra long valve life on corrosive or erosive services where a non-lubricated valve is preferred, specify Homestead Lever-Seald Plug Valves. Mail coupon for more information.

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NAME	COMPOSITION PERCENTAGE Ag	Cu	Zn	Other	MELTING POINT °F	°C	FLOW POINT °F	°C	TROY OUNCES PER CU. IN.
EASY-FLO	50	15½	16½	(18 Cd)	1160	625	1175	635	5.0
EASY-FLO 3	50	15½	15½	(16 Cd-3 Ni)	1170	630	1270	690	5.0
EASY-FLO 45	45	15	16	(24 Cd)	1125	605	1145	620	4.9
EASY-FLO 35	35	26	21	(18 Cd)	1125	605	1295	700	4.9
SIL-FOS	15	80		(5 P)	1185	640	1300	705	4.5
SIL-FOS 5	5	88¾		(6¼ P)	1185	640	1300	705	4.4
TEC*	5			(95 Cd)	640	340	740	395	4.6
TEC-Z*	5		16.6	(78.4 Cd)	480	250	600	315	4.5
BRAZE 071 (SN #7)†	7	85		(8 Sn)	1225	665	1805	985	4.8
" TL	9	53	38		1410	765	1565	850	4.5
" ATT	20	45	30	(5 Cd)	1140	615	1500	815	4.6
" 202 (AT SPEC)†	20	45	35		1315	715	1500	815	4.7
" NE	25	52½	22½		1250	675	1575	855	4.7
" 251 (AE)†	25	57½	17½		1270	690	1625	885	4.7
" NT	30	38	32		1250	675	1410	765	4.7
" DT	40	36	24		1235	670	1415	770	4.8
" SS	40	30	28	(2 Ni)	1220	660	1435	780	4.8
" 404 (SS-5)†	40	30	25	(5 Ni)	1220	660	1580	860	4.7
" DE	45	30	25		1225	665	1370	745	4.8
" ETX	50	34	16		1250	675	1425	775	5.0
" 541 (4772)†	54	40	5	(1 Ni)	1340	725	1575	855	5.1
" 560 (ER)†	56	22	17	(5 Sn)	1145	620	1205	650	5.0
" 580 (EB)†	57½	32½		(7 Sn-3 Mn)	1120	605	1345	730	5.1
" RT	60	25	15		1245	675	1325	720	5.0
" 603 (RT-SN)†	60	30		(10 Sn)	1115	600	1325	720	5.2
" 630 (RSNI)†	63	28½		(6 Sn-2½ Ni)	1275	690	1475	800	5.1
" EASY	65	20	15		1240	670	1325	720	5.1
" 655 (RE-MN)†	65	28		(5 Mn-2 Ni)	1385	750	1560	850	5.2
" MEDIUM	70	20	10		1275	690	1360	740	5.1
" BT	72	28			1435	780	1435	780	5.2
" HARD	75	22	3		1365	740	1450	790	5.3
" 752 (TR #1)†	75		25		1300	705	1330	720	5.1
" IT	80	16	4		1340	725	1490	810	5.3
" 852 (85 Ag-15 Mn)†	85			(15 Mn)	1760	960	1780	970	5.1
PREMABRAZE 610	61	24		(15 In)	1155	625	1305	705	5.0

*A Solder—Not a Brazing Alloy. †Former Names

Space does not permit listing the many special alloys, formulated for a particular or unique application. Handy & Harman Brazing Engineers and Technical Service are always ready to work closely with you on metal joining problems and methods.

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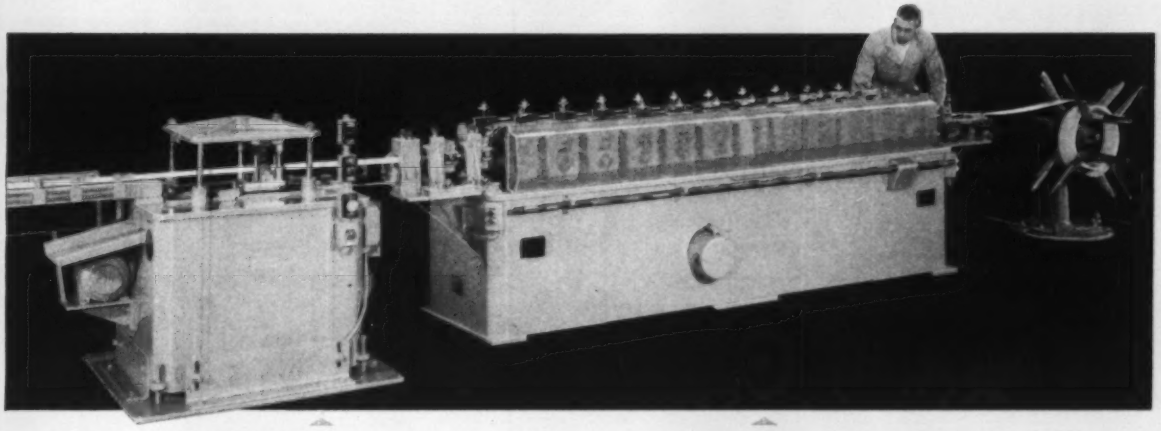

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MODEL N-MR-12
LOCK-SEAM TUBING MILL

This typical production line forms lock-seam tubing in desired lengths, producing at 80 fpm. Prepainted or vinyl-coated .032 aluminum enters the tube mill and is progressively formed into lock-seam tubing. Tube then goes through straightener attachments and tube puller, prior to entering the flying cut-off press where it is automatically cut to length.

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This new line of high production, heavy duty machinery will be demonstrated for the first time at the Machine Tool Exhibition of 1960.

Designed for heavy duty continuous production at high speeds of lock-seam tubing, accoustical ceiling sections, aluminum window screen sections, drawer slides, aluminum siding and a variety of other sections, this equipment may be operated in battery of units by a single operator, producing finished sections at rates up to 120 fpm. The flying cut-off press cuts sections to extreme accuracy.

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At BOOTH 1001, Machine Tool Exhibition of 1960.

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including the "fine print" which reads:

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Hundreds of these machines are now in production service, proving the design and efficiency needed for competitive production. Real production efficiency results from low initial cost, high performance rating, and minimum maintenance required.

metalworking dollars?

FOR WIDE-RANGE FLEXIBILITY —

MODEL OGN
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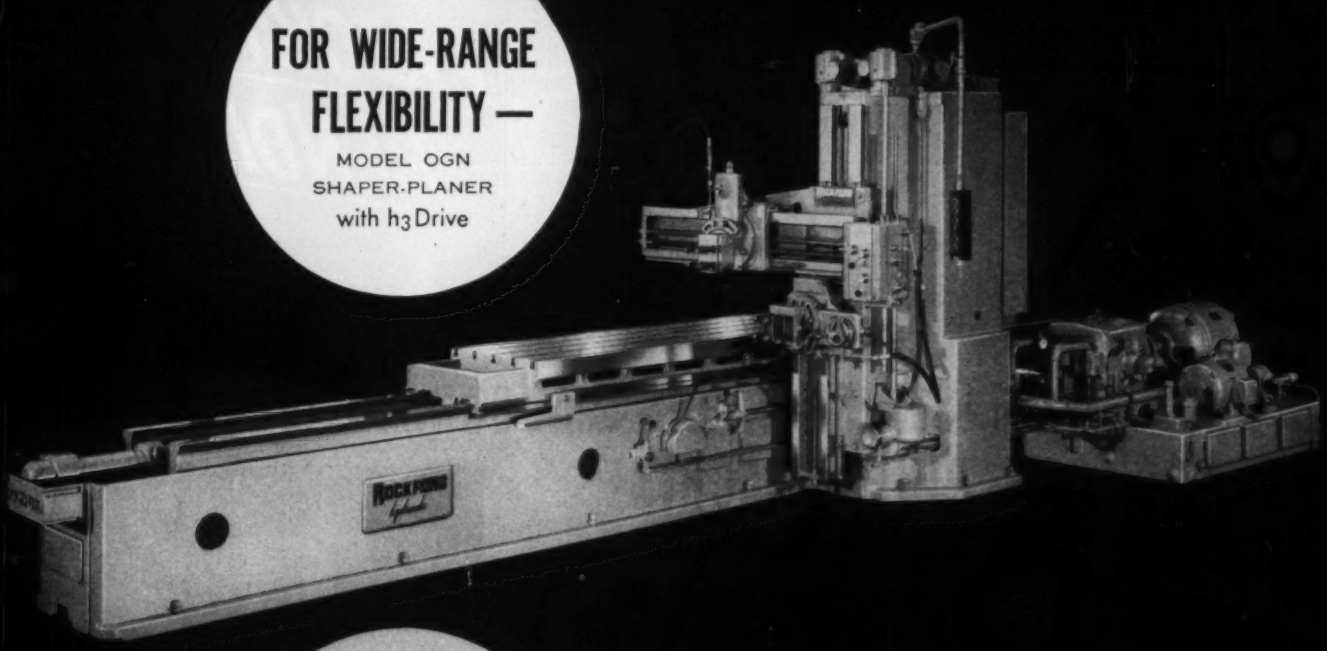

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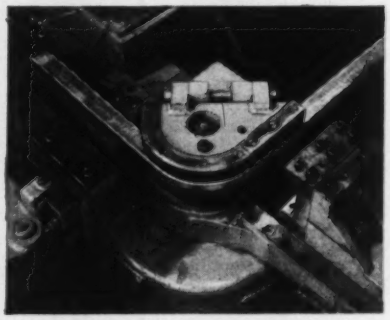
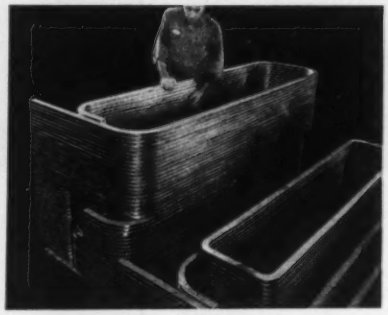
MODERN MACHINE TOOLS MMT=PE PRODUCTION EFFICIENCY

HUGE ATOM SMASHER COIL ACCURACY HELD TO ±.010" ON PINES MACHINES.

Precision bending over 400 tons of pure extruded copper bar into magnet coils for the Alternating Gradient Synchrotron at Brookhaven National Laboratory was a tough job because of the precision required. Coil bending was done at National Electric Coil Division of McGraw Edison Company, Columbus, Ohio, on a Model 2 Pines Bender. Copper bars 7/8" x 1 19/32", with a 3/8" center hole extruded the full length, were edge bent to 90°. Four radii between 1 1/2" and 6 3/8" form the various coil sizes. Precise bend accuracy made possible nesting of the turns for assembly into a completed coil. On the rectangular turns, ranging in sizes to 13 1/2" x 93", width dimensions between bends were held to ± .010"and length to ± .015". Center hole distortion was controlled to within 1/16" on the diameter and ± 2 1/2% in area. Tooling includes a hinge-type bending form and lap-over type clamp and pressure dies.



Precision tooling includes split-type bending form for fast, efficient parts handling.



Finished turns bent to ± .010" width, ± .015" length accuracy, nest perfectly into completed coils.

Bending can be the profitable solution for you...

. . . as it has for hundreds of metalworking plants that have applied Pines methods, machines, and tooling to bending a wide range of tubing, pipe, extruded or rolled shape parts. Increased production . . . improved quality . . . reduced costs have been achieved on long and short runs, large and small parts. Analysis of your metal fabricating procedures may reveal unusual opportunities for cost-cutting application of this fast, accurate metal forming method. Call on Pines' experience and skill . . . always available to assist you without obligation.

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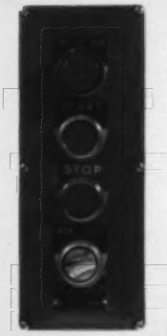
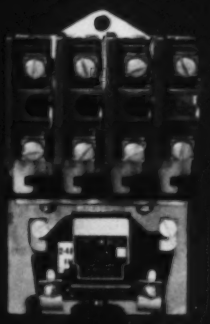
CLARK CONTROLS...

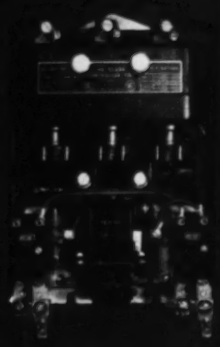


NEW Push
Button Line



"PM" Relay Line...

with new "Color-Selective"
Conversion Kits



Type "CY" Starters...
the standard for longer
operating life

SEE FOR YOURSELF WHY
THEY GIVE YOU MORE THAN
ANY CONTROLS YOU CAN NAME

The
CLARK CONTROLLER
Company

compare

see for yourself why...

NEW Clark Push Buttons with exclusive wipe action contacts give you more

WIPING CONTACTS—a Clark Controller exclusive—assures minimum contact resistance at all times. As contacts close, unique Clark design creates a sliding action that wipes faces clean of dust and oil.

DUAL COLOR-CODING—buttons and ferrules—in many separate colors, makes possible advantageous color-coding of stations both by individual operating function and group function.

THREE TYPES OF UNITS offer greater flexibility for any application:

- Type HO Oiltight—Panel or Base Mounted
- Type H NEMA I—Base Mounted
- Type H NEMA I—One Hole (Panel) Mounted

The new Clark Push Button line includes a complete range of buttons, selector switches, pilot lights and push-to-test lights or lighted push buttons—available as individual control units or mounted in enclosures or on flush plates.

compare

see for yourself why...

Clark Type "CY" Starters give you more than any other A-C magnetic starter

Whatever your basis for comparison let your own performance check show you how Clark Type "CY" Starters outperform all other starters—give you more.

DEPENDABILITY? Compare the Clark Type "CY" Starter in the toughest application you can find—then see for yourself how it continues to operate dependably where other starters fail.

LONGER OPERATING LIFE? Make your own comparison life test—then see for yourself how much better a Clark Type "CY" Starter holds up under any operating conditions.

OTHER ADVANTAGES? Your own comparison tests on installation, maintenance, and any other requirements, will let you see for yourself that the Clark Type "CY" Starter gives you more than any other A-C magnetic starter in every area of importance.

Clark Type "CY" Starters are available in many combinations, in sizes 0 thru 4, and in a variety of enclosures and forms to meet every industrial application.

More for your money with

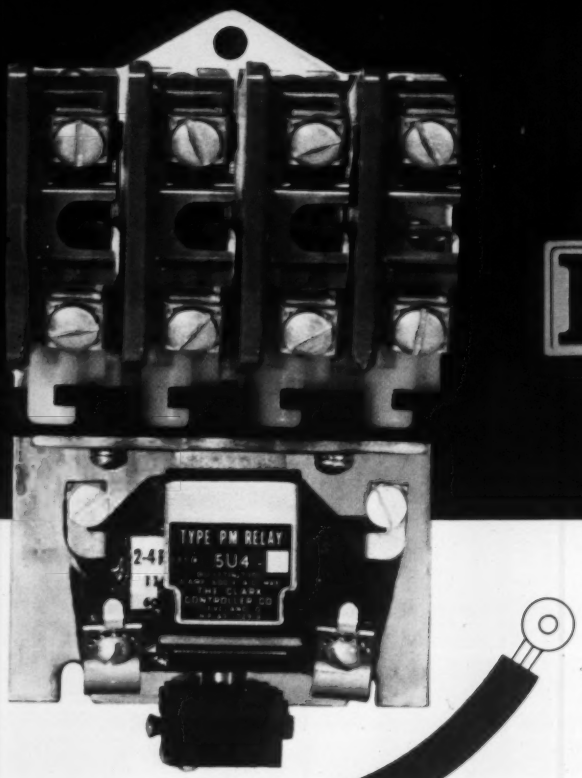
CLARK PUSH BUTTONS

DEMONSTRATION? Ask your local Clark distributor or district sales representative for a demonstration and free literature on the new push button line. Or, write direct to The Clark Controller Company.

More for your money with

CLARK STARTERS

MORE INFORMATION? Your local Clark distributor or district sales representative will be glad to help you set up your own comparison tests. Ask for literature on the complete Clark Type "CY" Starter line, too. Or, write direct to The Clark Controller Company.



compare

see for yourself why...

Color-coded conversion kits help solve any relay circuit problem with building-block simplicity

New color-coding of conversion kits by function now makes it possible for relay users to take even greater advantage of the versatility and flexibility of the complete, integrated line of Clark "PM" Relays.

Basic relays are easily modified on the job with a few simple conversion kits to give you a virtually unlimited number of circuit arrangements on convertible pole, universal pole, latch and time-delay relays.

The "modular construction" of all relays in the Clark "PM" line insures integrated uniformity, compactness and flexibility. Functional alignment in mounting results in neater, more uniform panels and most efficient utilization of valuable space.

More for your money with

CLARK RELAYS

COMPLETE INFORMATION on Clark color-selective conversion kits is available through your local Clark distributor or district sales representative. Or, write direct to The Clark Controller Company.

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YODER ROTARY SLITTERS

If your slitting requirements call for coil widths from 12" to 60", in gauges from .015" to .250", the economy of purchasing Yoder Slitting Machinery can be yours. Operating a Yoder Slitting Line only one eight-hour shift per week, for example, could easily produce 35 tons of slit strands per week... or 1,820 tons every 52 weeks. At a slitting cost saving of only ½¢ per pound, the annual savings would amount to $18,200.

Additional savings can be realized through lowered inventory of mill-width coils—less waiting for delivery of special slit widths. Also, customer satisfaction will increase as you achieve faster completion and delivery of finished products.

At your request a Yoder sales engineer will study your plant operation to determine what equipment would most economically... and profitably... serve you, whether it be standard components or a completely specialized and engineered line.

Send for this illustrated text on slitting operations and equipment. It describes methods, time studies, operating cycles, material handling, and gives full specifications.

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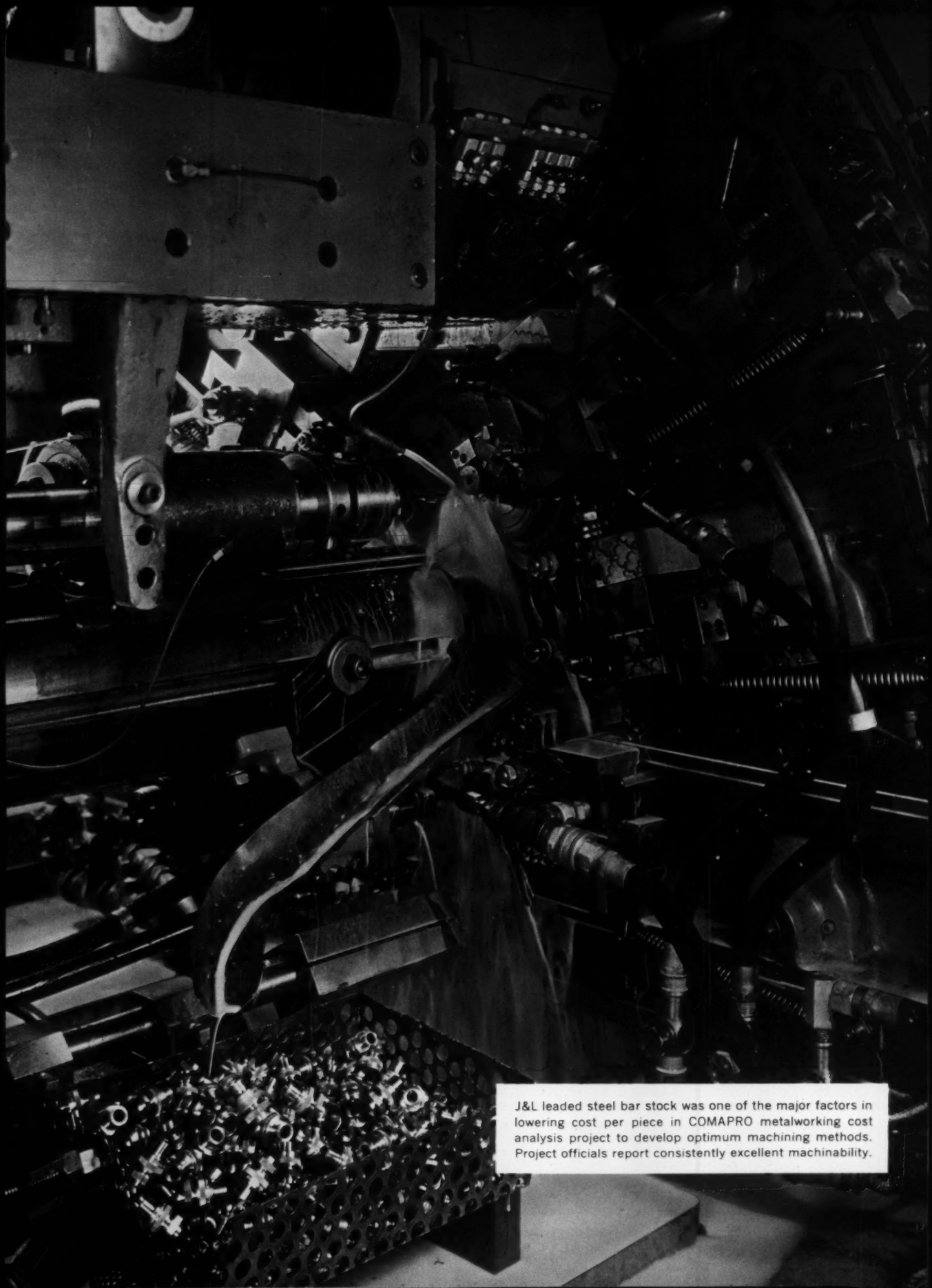


J&L leaded steel bar stock was one of the major factors in lowering cost per piece in COMAPRO metalworking cost analysis project to develop optimum machining methods. Project officials report consistently excellent machinability.

Final COMAPRO tests prove . . .

J&L leaded steel bars are a key factor in cutting production time 30%

Excellent machinability of J&L Type A leaded cold finished bars has been proved by the widely recognized cooperative machining program conducted at Cone Automatic Machine Company, Inc., Windsor, Vt.

COMAPRO's final report covered a period of many months of tests on the machining of spark plug shells under scientific laboratory-controlled conditions.

It highlights these important facts:

1. Production time per machined unit was cut from 6.5 to 4.41 seconds—a reduction of approximately 30%.
2. The tools of the automatic bar machine demand a degree of uniform machinability in the bar stock which J&L Type A leaded steel consistently provided.
3. The free machining quality of J&L leaded steel reduced tool changes.

These results are typical of the benefits many companies have been getting with J&L free-machining steels. In actual production runs, the use of J&L's Type A leaded steel has increased overall output rates 22%, reduced tool costs 50%, and has required less power than making similar parts of conventional steel.

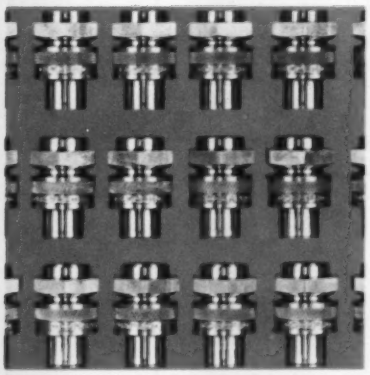
This Steelmark identifies products made of steel. Place this mark on your products. And look for it when you buy.

Steel

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

Where cold rolled steels originated in 1859

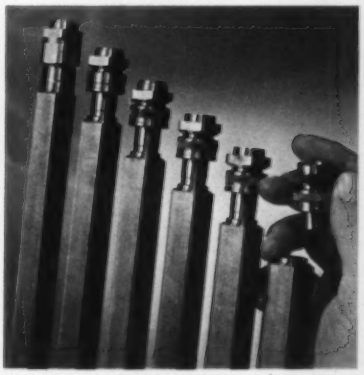


Spark plug shells were selected as typical machined parts for COMAPRO tests. Note superior finish of completed units produced from J&L 13/16" leaded hexagon bar stock.

COMAPRO tests were run on this six-spindle Cone automatic bar machine which permits continuous end-to-end feed of bars from the reel into the machine.

New two-unit feed mechanism developed by COMAPRO provides quieter operation, longer tool life, stock savings, closer tolerances and other important advantages.

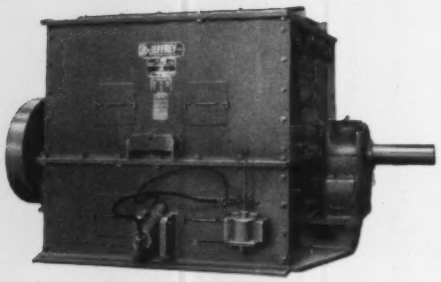
J&L STEEL



Six machining steps are required to produce the spark plug shell. Machining cycle time was cut 30%, due in large part to the fine machinability of J&L's leaded steel.

COMAPRO emphasizes well organized tool control; makes use of modern pre-set, quick-change type of holders, with gauges. Result: time for tool changes is greatly reduced.

Jeffrey Pulverizer crushes fluxstone fine for efficient sintering



TYPE B PULVERIZER

The Jeffrey Type B Pulverizer has many advantages in crushing fluxstone for sintering operations. It crushes *fine* – standard 3/8", or 1/8", when required. This is possible since the material goes through several changes in direction and several hammer contacts before it reaches the screen bars.

This unit is reversible, designed for heavy duty work, is dust-tight, and has hydraulic adjustments. Power requirements are less than with other units, since most of the work on the material is done before the material reaches the screen bars.

Fluxstone is but one of hundreds of materials which can be efficiently reduced with Jeffrey Crushers... from alum and asbestos to rock and slag. For complete information check your nearest Jeffrey sales engineer. The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

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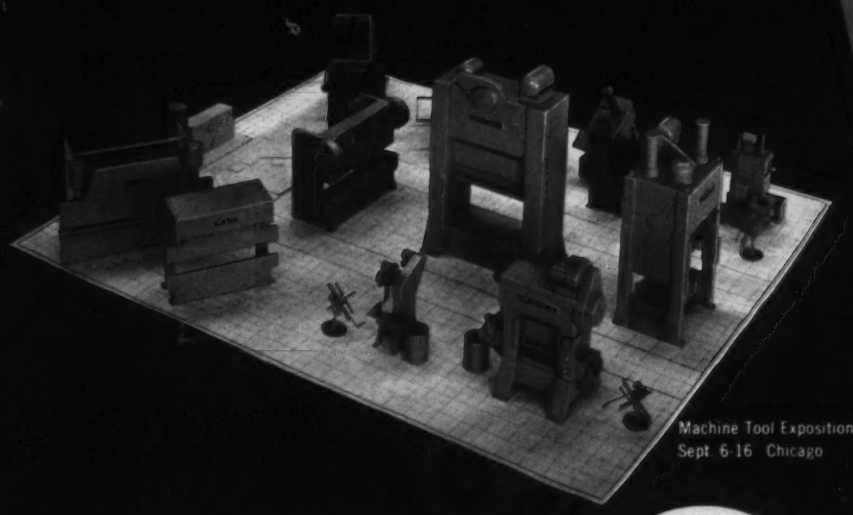


Machine Tool Exposition
Sept. 6-16 Chicago

NIAGARA BOOTH 1330 MMT-PE

a whole press and shear show in itself!

Once again, Niagara has come through with the "newest of the new"! Never before have so many new developments in metal forming and shearing machines been planned into so large an exhibit area. All told, there'll be a "live" show of a dozen machines in operation . . . many engaged in actual production.

From aisle to aisle, here is an action-packed exhibit that will prove especially profitable to press, press brake, and shear users looking for new ways to boost production, improve work quality, and cut costs. Key men from Niagara (yes, top management, too) will be on hand to welcome you and answer questions on-the-spot. Come. Visit Niagara. Allow plenty of time. See all there is to see.

NIAGARA

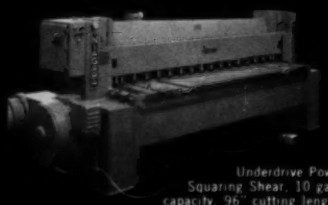
NOW TURN THE PAGE for a glimpse of what you'll see in Booth 1330

. . . AND they'll all be in action at the Machine Tool Exposition

Mech. Sleeve Clutch OBI Press with forming die and demonstration of Niagara Portable Tonmeter.

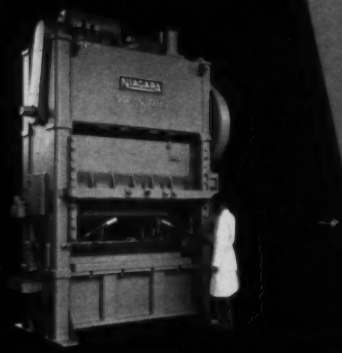
60 ton Inboard Drive Mech. Press Brake. Will perform several operations with multi deck forming die.

100 ton Double Crank Straight Side Fully Automatic Press with progressive die. Will be shown in production along with Niagara's Load Monitor.

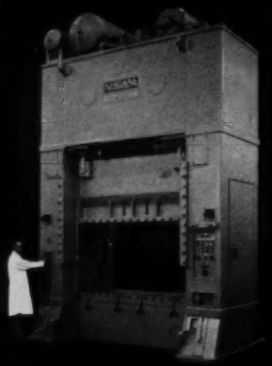


Underdrive Power Squaring Shear, 10 gage capacity, 96" cutting length.

Sliding Bolster Front to Back Crankshaft OBI Press. Will produce giant bottle openers with 2 quick change dies.



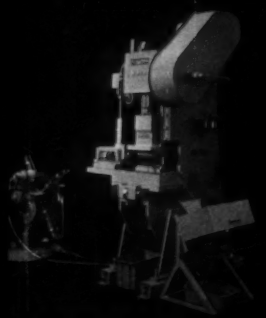
150 ton Double Crank Straight Side Press with 9 station transfer feed.



250 ton, 2 pt. suspension, Straight Side Eccentric Geared Press for automation line. Will produce parts with unique Adjustable Draw Die.

150 ton Mech. Press Brake with alternating 2 speed stroke control. Will form bends on long sheets.

45 ton Front-to-Back Crankshaft OBI Press with automatic roll feed, stock reel, & scrap cutter. Will stamp fuse tips at million/day rate.



Ultra High Speed Automatic OBI Press package with progressive dies. Will operate at variable speeds up to 1000 spm producing parts at rate of over million/day.

Overdrive Power Squaring Shear with 18" gap, ½" capacity, 144" cutting length.

400 ton Hydraulic Press Brake to be exhibited with variety of forming dies.

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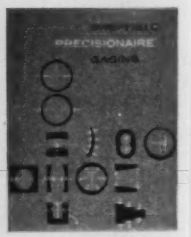

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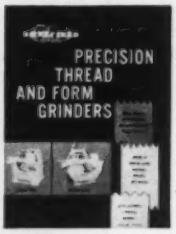

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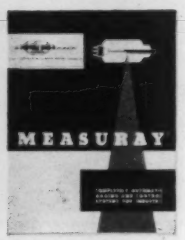

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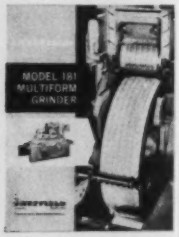

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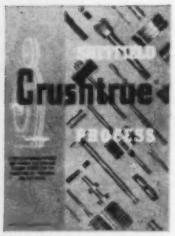

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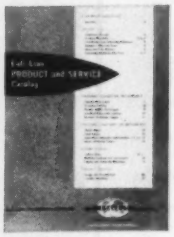

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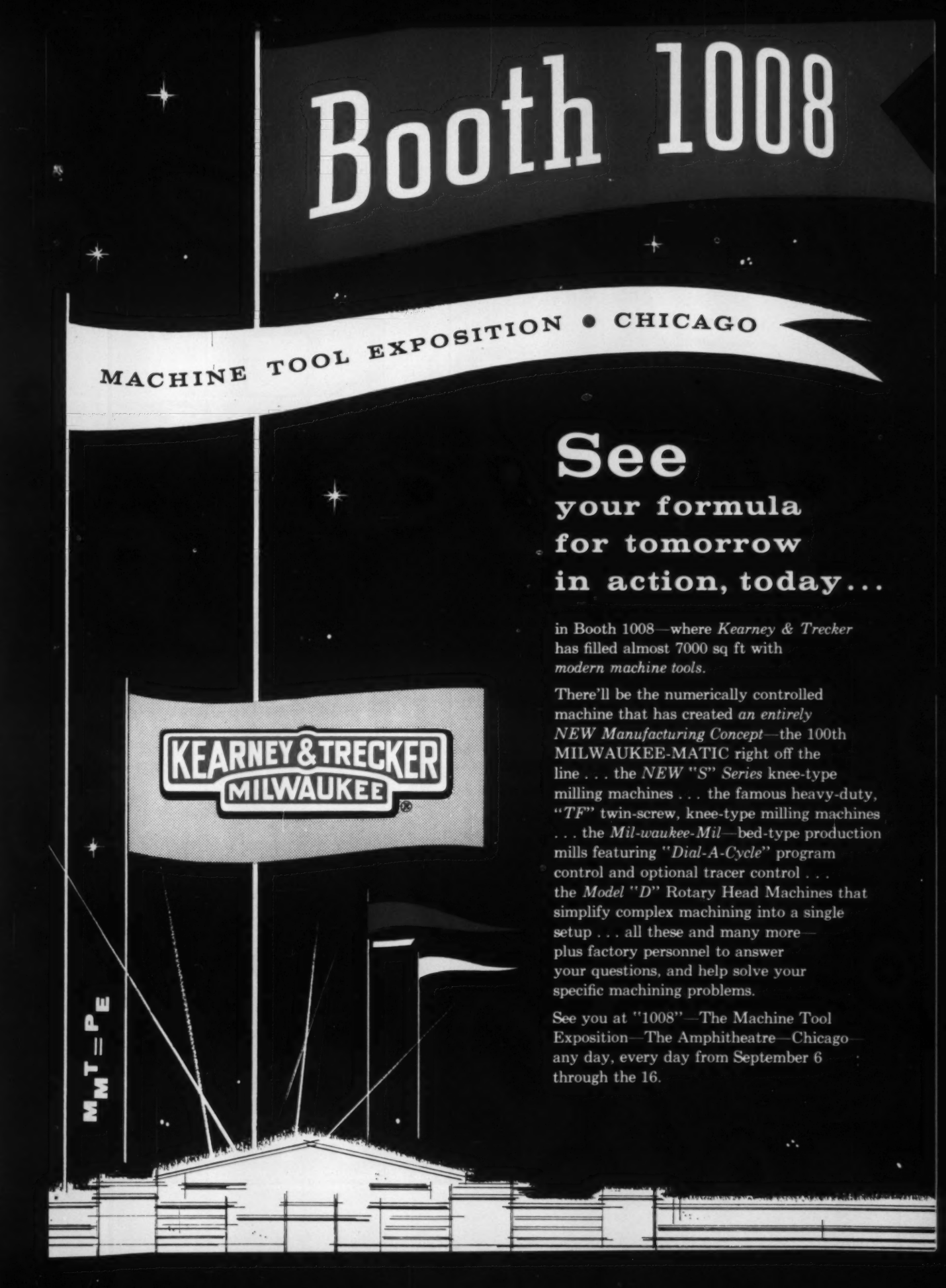

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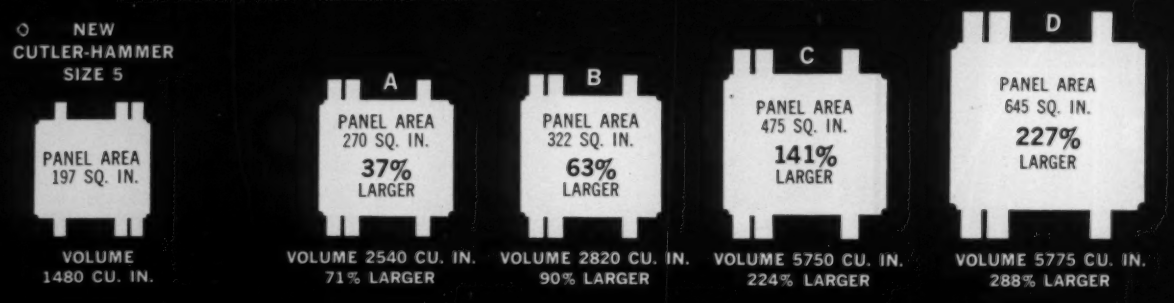
There'll be the numerically controlled machine that has created *an entirely NEW Manufacturing Concept*—the 100th MILWAUKEE-MATIC right off the line . . . the *NEW "S" Series* knee-type milling machines . . . the famous heavy-duty, *"TF"* twin-screw, knee-type milling machines . . . the *Mil-waukee-Mil*—bed-type production mills featuring *"Dial-A-Cycle"* program control and optional tracer control . . . the *Model "D"* Rotary Head Machines that simplify complex machining into a single setup . . . all these and many more—plus factory personnel to answer your questions, and help solve your specific machining problems.

See you at "1008"—The Machine Tool Exposition—The Amphitheatre—Chicago—any day, every day from September 6 through the 16.

THE NEW CUTLER-HAMMER SIZE 5 STARTER IS FAR MORE COMPACT THAN OTHERS



Now! A complete line of easy-to-install Cutler-Hammer Starters including a new compact Size 5

7 sizes for use as components or as complete starters

(Size OO, O, 1, 2, 3, 4 and 5)

Now get all the advantages of Cutler-Hammer's Three Star starter line in seven sizes. You can control motors from fractional hp up to 200 hp, now that the new Size 5 is available.

The new Size 5 starter needs only an eight-inch deep case. Its open dimensions are only 13″ wide, 15 3/16″ high, 7½″ deep . . . and is available as a non-reversing or reversing starter or as a contactor.

Even the wiring's easier. Instead of struggling to force the line and load cables into the lug connectors, the lugs unbolt, and are easily reassembled.

You still get, of course, the famous Three Star advantages that have made Cutler-Hammer Starters so famous: dependable pivoted armature, vertical contacts that don't collect dust, ease of installation, ease of inspection and maintenance, plus many other features.

Be sure to send for Pub. LO-69-Q213 to get all the facts on the complete Cutler-Hammer Starter line.

What's New at Cutler-Hammer? There's a new spirit here. You can see it in the new products, the new engineering talent, the increased plant capacities. We're ready for the great growth of the sixties so you can be ready to meet the great demands upon your capacities. We'd like to tell you more. Contact the Cutler-Hammer electrical distributor or the Cutler-Hammer sales office nearest you.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

Come see us at the Machine Tool Show,
Sept. 6-16, Booths 142-144-146-148, Navy Pier.

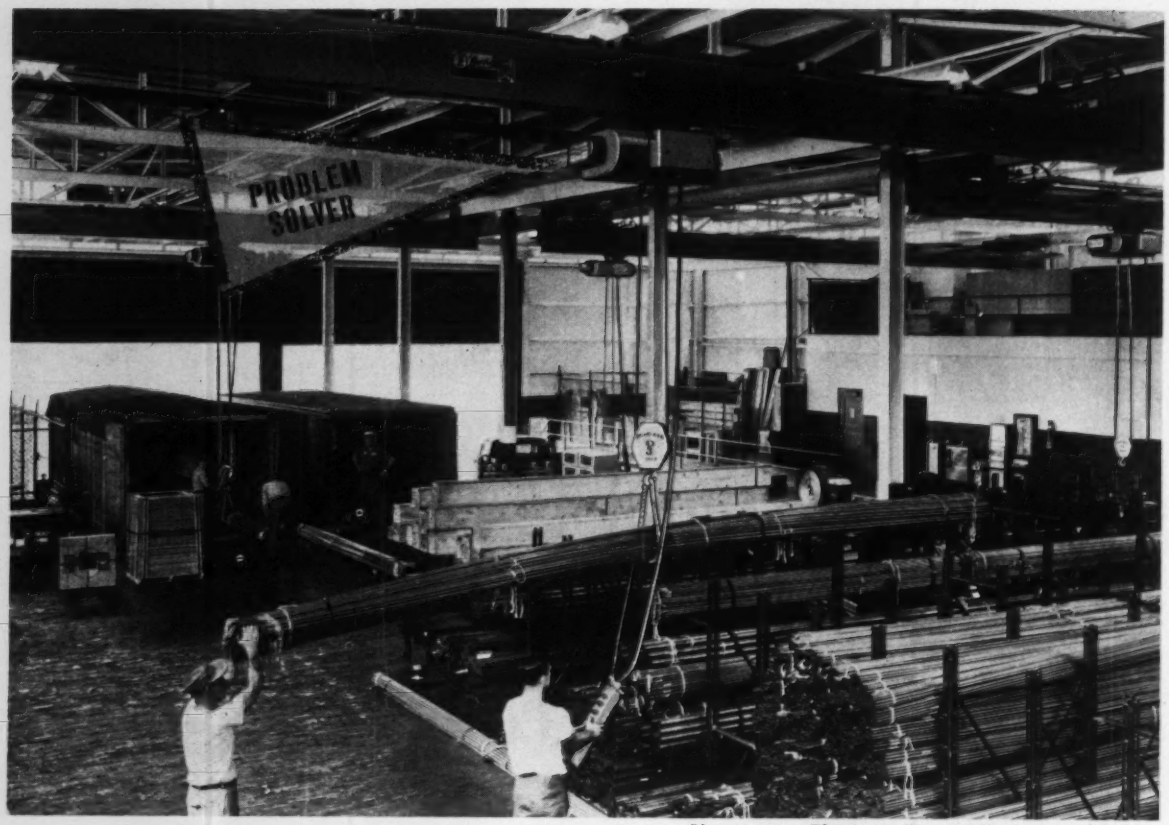
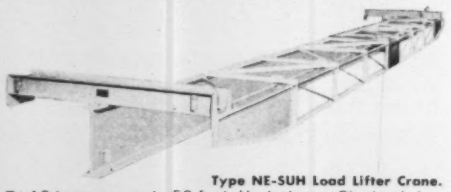


Photo courtesy The Austin Company Engineers and Builders

2,500,000 lb. stock handled by 3-ton Load Lifter® Cranes

Type BR Load Lifter Crane.
To 50 tons, spans to 60 ft. Double girder, top running. Highest efficiency gearing for easy manual operation. Fast acting load brake. No hanging tail chains.



Type NE-SUH Load Lifter Crane.
To 10 tons, spans to 50 feet. Underhung. Single girder. 6-ft. wheel base. "Shaw-Matic" bridge drive cushions starts and stops. Push-button control. 150 FPM.

Budgit Crane Assemblies.
Low-cost "build it yourself" kits to build single girder cranes to 6 tons, 30 ft. span; 180° swinging bracket jib cranes to 4½ tons with 10 ft. reach.

60 J-1

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

The American Brass Company's warehouse in Cleveland was designed to handle materials at top efficiency. Unloading, storage, and shipping are a continuous simultaneous process without duplication of effort or area.

The 300-foot long building has a trucking bay at one end and a railroad spur at the other. Four 3-ton Load Lifter Cranes can handle material — pipe, plate, sheeting, rods, bars, tubes — to and from any storage area in the 50-foot wide storage bays. The cranes are operated from the floor by push button control.

If needed, two cranes can be coupled for fast horizontal transfers from bay to bay. Loads which took hours to handle in the old warehouse can be transferred in minutes in this building. Truck turn-around time is greatly reduced, the stockmen are relieved of dangerous lifting, and stockkeeping is always orderly. Handling costs are greatly reduced.

Whatever your problem in overhead load handling, ask your Shaw-Box Distributor for counsel. Or write for Bulletin 15005-5A.

OVERHEAD CRANES FOR ALL INDUSTRY

A product of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore, Ltd., Galt, Ontario

MMT-PE

Visit Area No. 1134

MACHINE TOOL EXPOSITION

International Amphitheatre, Chicago, Sept. 6-16

CHICAGO

DREIS & KRUMP

Mechanical and Hydraulic Press Brakes in Operation and Press Brake Tooling

Bending and Forming

Sheet Metal and Steel Plate

AT THE FACTORY

7400 South Loomis Boulevard

15-minute ride from Amphitheatre • Courtesy cars available

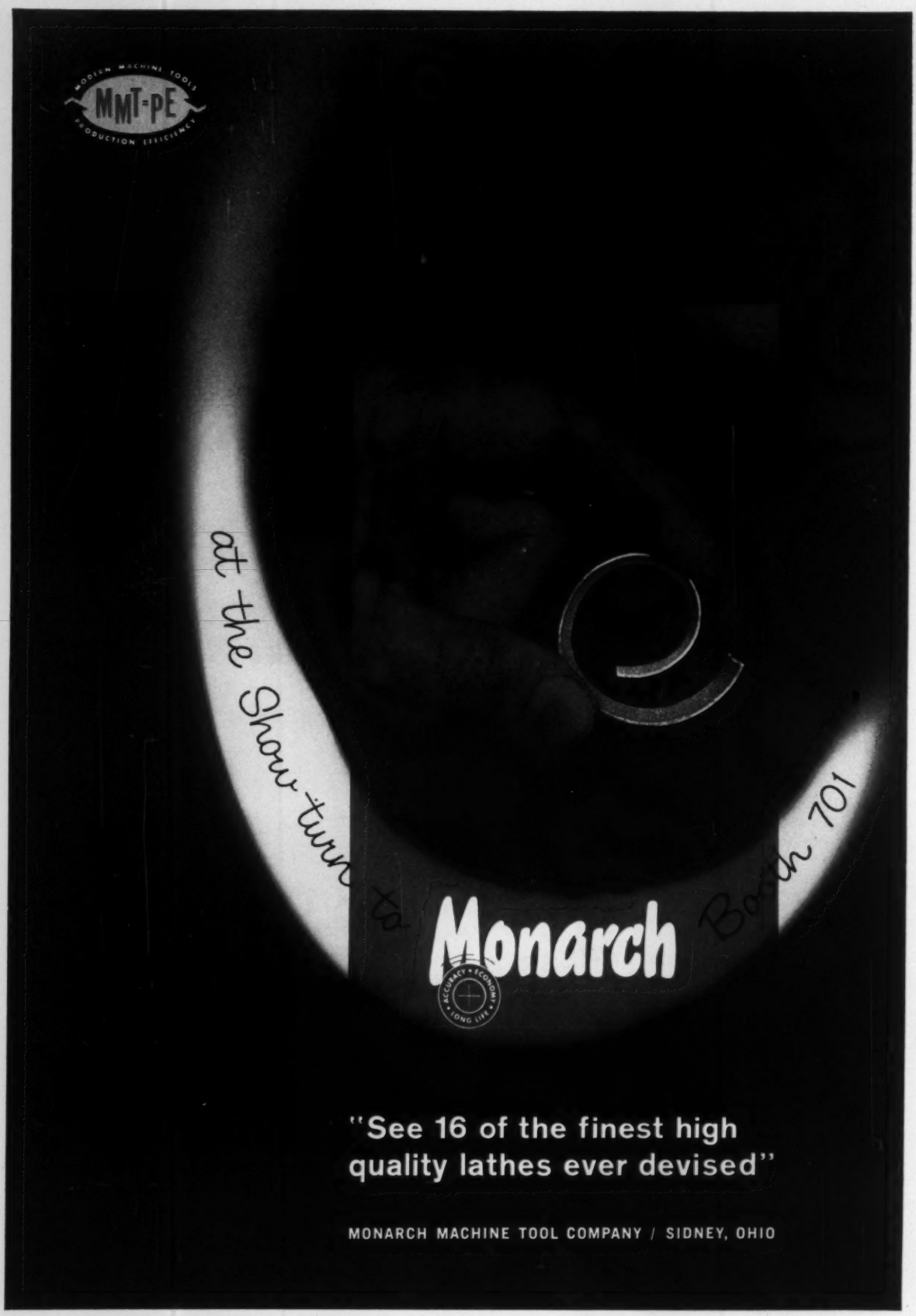
PRESS BRAKE APPLICATION AND TOOLING CLINIC

and see more

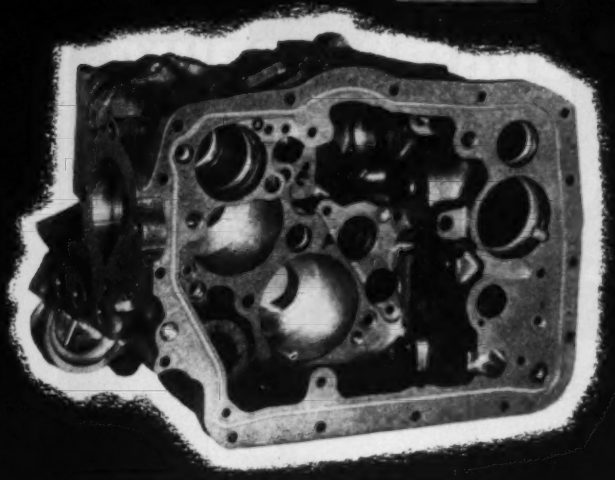
Press Brakes • Power Bending Brakes

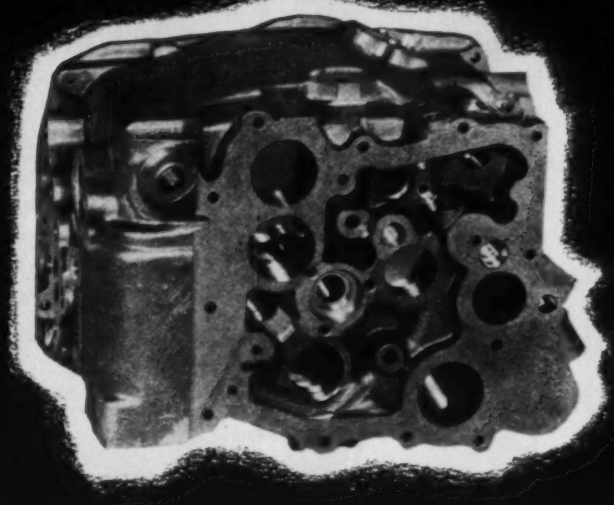
Folder Brakes • Hand Bending Brakes

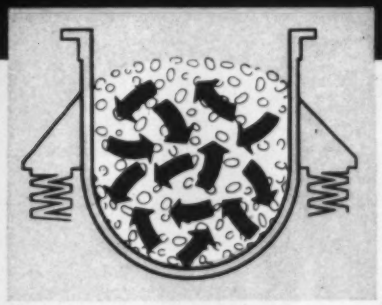
9019


MMT=PE
MODERN MACHINE TOOLS
PRODUCTION EFFICIENCY
at the Show turn to Monarch Booth 701
ACCURACY • ECONOMY • LONG LIFE
"See 16 of the finest high quality lathes ever devised"
MONARCH MACHINE TOOL COMPANY / SIDNEY, OHIO

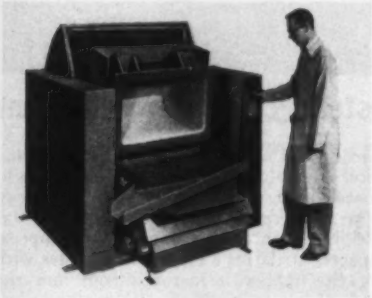
CALL ON **ROTO-FINISH RANSOHOFF** FOR *Finishing Results* LIKE THIS . . .







CONSTANT OVERALL ABRASIVE ACTION—The Vibratron work zone extends throughout the abrasive mass. Every surface is subject to constant vibrating abrasive action.

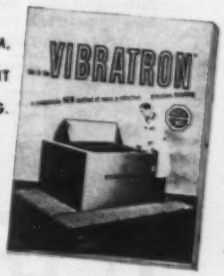


NO MORE MANUAL HANDLING of parts and media. A built-in removable separator does the job. There's no need for an extra separator.

COMPLEX ALUMINUM CASTINGS DEBURRED 2 at a time . . . in 15 minutes . . . . . the **VIBRATRON** way!

Woodward Governor Co., Rockford, Ill., long a leading manufacturer of all types of governors for prime movers, manufacture such highly precise equipment as jet engine fuel control systems. Precise finish and dimensional tolerances are a must! The fuel control shown above was previously hand deburred and then tumbled in a multiple compartment machine for 1 hour. Now . . . these cases are processed *2 at a time in 15 minutes* in the Vibratron. Hand operation is cut by a third, and the finish is more uniform.

IF YOU NEED HELP ON A FINISHING PROBLEM, *Write or Phone today* FOR FULL PARTICULARS. IT WILL PAY YOU TO GET THE FACTS ON VIBRATRON PROCESSING.

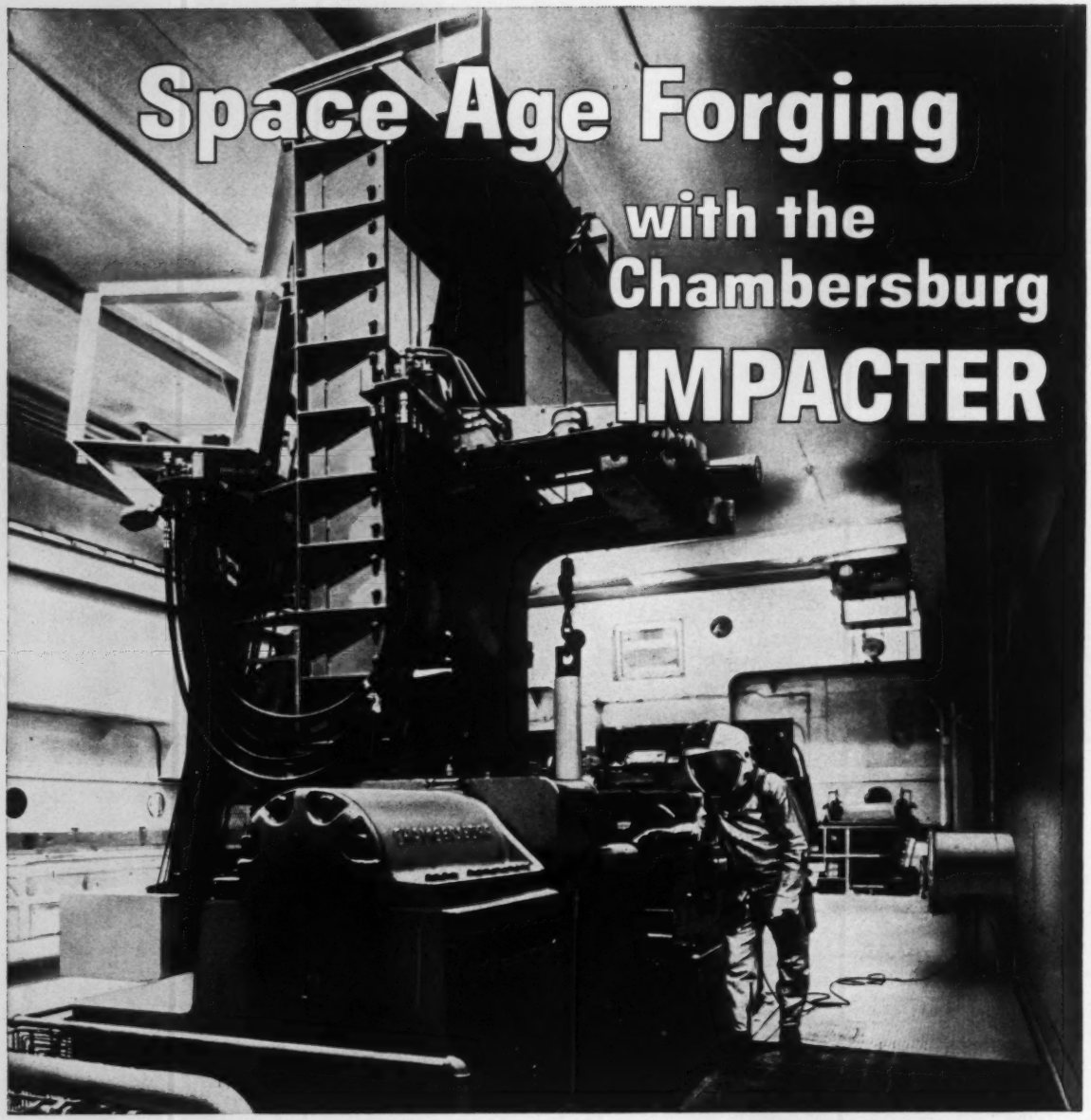


ROTO FINISH

ROTO-FINISH / RANSOHOFF

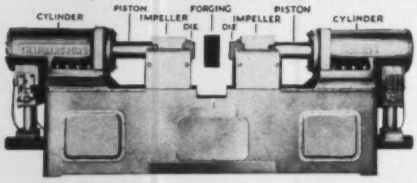
3717 Milham Road, Kalamazoo, Michigan — Phone: Fl reside 3-5578

FOREIGN REPRESENTATIVES: ARGENTINA—Taller—Buenos Aires ● AUSTRALIA—A. Flavell Ltd. - Cheltenham ● BRAZIL—Commercial E. Industrial de Fornos Werco, Ltd.—Rio de Janeiro ● CANADA—Canadian Hanson & Van Winkle Co., Ltd.—Toronto ● ENGLAND—Roto-Finish Ltd. — Hemel Hempstead ● FRANCE—Societe Roto-Finish—Paris ● GERMANY, AUSTRIA, NORWAY, SWEDEN, SWITZERLAND—Metallgesellschaft A. G.—Frankfurt, a. M.—Germany ● HOLLAND, BELGIUM, LUXEMBURG—N. V. Roto Finish Maatschappij—Delft, Holland ● ITALY—Societa Roto-Finish a R. L.—Milan ● MEXICO—Enthone de Mexico, S. A. Prol Pina 689, Mexico 15, D. F. ● SPAIN—Instituto Electroquimico, S. A.—Barcelona



Today's forging problems will not be solved with yesterday's forging equipment

THE IMPACTER: Designed and built by Chambersburg, pioneers in the development of machinery for forming metals by impact. In this revolutionary forging tool, the stock is struck from both sides by horizontally opposed rams. No shock, no vibration.



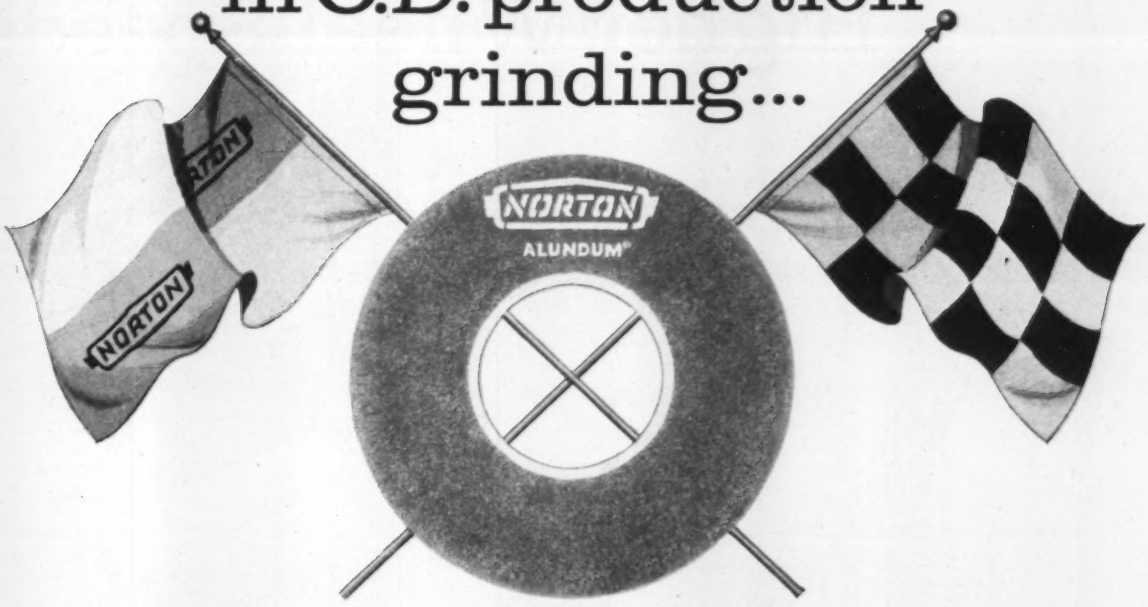
At the amazing new InFab project of Universal-Cyclops at Bridgeville, Pa., a Chambersburg Impacter is employed to forge ingots of molybdenum and other "exotic" metals in an atmosphere of pure argon gas, in which the workers have to wear space suits. The Impacter was selected primarily because of its instantaneous impact. At temperatures up to 4500° F, the Impacter strikes the ingot on two sides with 15,000 ft. lbs. of force; yet the impact is instantaneous and the transmission of heat to the die faces momentary. Other advantages are the Impacter's lack of shock or vibration, necessitating no heavy foundations, and the thorough working of the metal, deformation taking place equally on both sides. Learn more about this modern method of forging. Write today to Chambersburg Engineering Company, Chambersburg, Pa.

CHAMBERSBURG

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

BIG NEWS

in O.D. production grinding...



You Can Now Get Norton Grinders With

HIGHER WHEEL SPEED

SEE THEM AT THE SHOW

Watch Norton Grinders Running at 8500 SFPM!

Learn how their greatly stepped-up speed
brings you new production benefits...

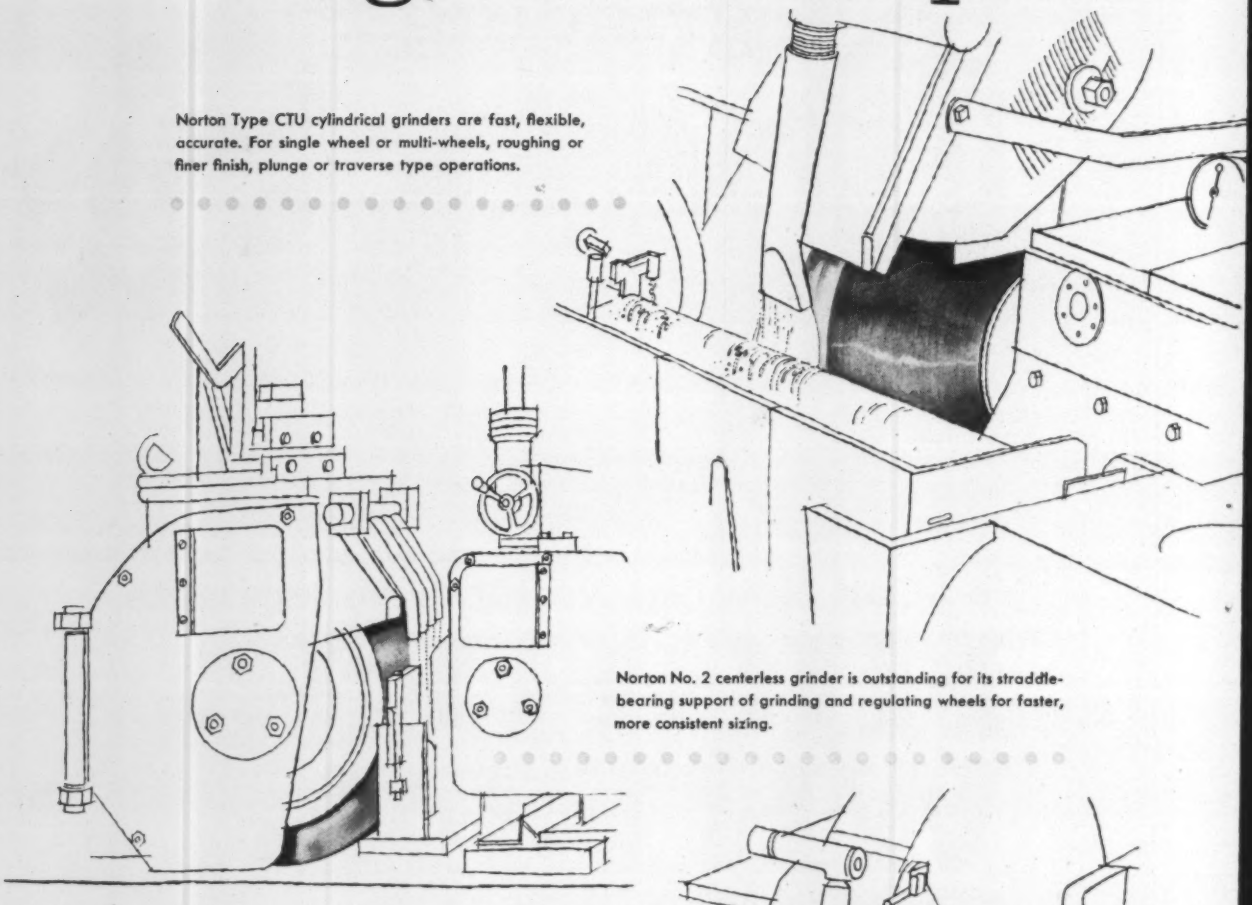
NORTON

Booth No. 651.
At the 1960 NMTBA Show

Announcing:

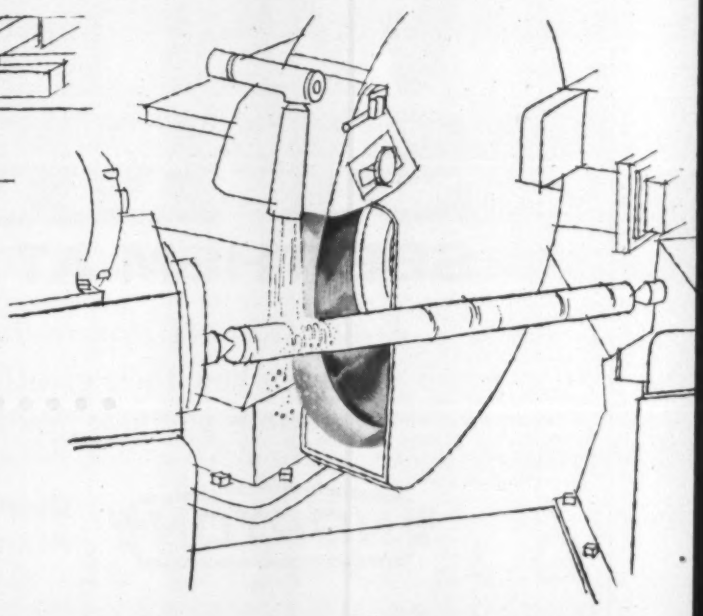
Higher Wheel Speeds

Norton Type CTU cylindrical grinders are fast, flexible, accurate. For single wheel or multi-wheels, roughing or finer finish, plunge or traverse type operations.



Norton No. 2 centerless grinder is outstanding for its straddle-bearing support of grinding and regulating wheels for faster, more consistent sizing.

Norton Type CP-1 PLUNGE-O-MATIC grinder designed solely for automatic plunge grinding, assures low unit cost production through fast, steadily paced action.



NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

to Speed Production

Norton grinders with Norton grinding wheels at 8500 SFPM grind faster and better, with more savings than ever before.

Norton comes up with this latest advancement only after exhaustive testing of Norton machines and Norton wheels at the new higher speeds.

In test after test Norton machine-wheel teams proved their ability to grind at 8500 SFPM — *not only with safety, but with more advantages than were ever obtained under the previous limitation of 6500 SFPM.*

That's why important Norton cylindrical production grinders — Type CTU, plus the No. 2 Centerless, plus Type CP-1 PLUNGE-O-MATIC® — are now available with wheel speed ranges stepped up to 8500 SFPM.

New Norton High-Speed Production Benefits

Higher Productivity. Increasing SFPM by 30% reduces grinding time by about one-third and increases pieces-per-hour.

Finer Surface Finish. On most cylindrical jobs, the new higher wheel speed means a finer finish. On Norton machines this advantage is now available to you.

Longer Wheel Life. 8500 SFPM cuts down number of wheel dressings needed thereby increasing the production life of the wheel.

Lower Wheel Cost. Longer wheel life means more pieces-per-wheel, longer wheel use per dollar and thus lower operating cost per wheel.

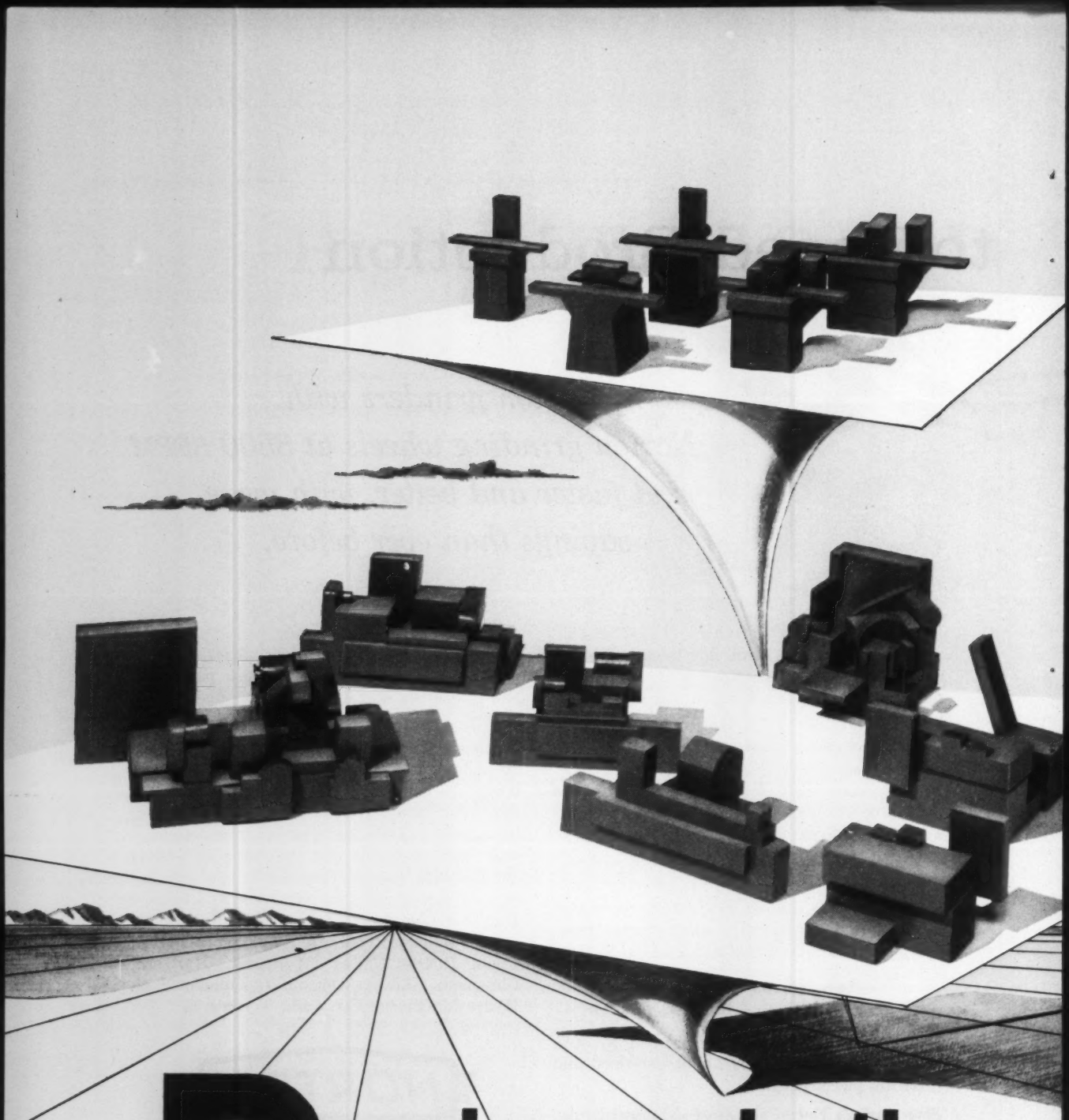
From now on Norton grinders arranged for the new maximum of 8500 SFPM will be so identified by an attached plate. Norton grinding wheels of the types approved and specially tested for the higher operating speed will also be identified to show this approval. For details on how Norton wheels and machines can bring the new high speed advantages to your production — *fast!* — call your Norton Man, a trained Grinding Engineer. Or write to NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. *District Offices:* Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

NORTON

75 years of . . .

Making better products... to make your products better

MACHINE TOOL DIVISION: Grinding and Lapping Machines — **G & E DIVISION:** Shapers • Gear Cutting Machines • Gear Induction Hardeners



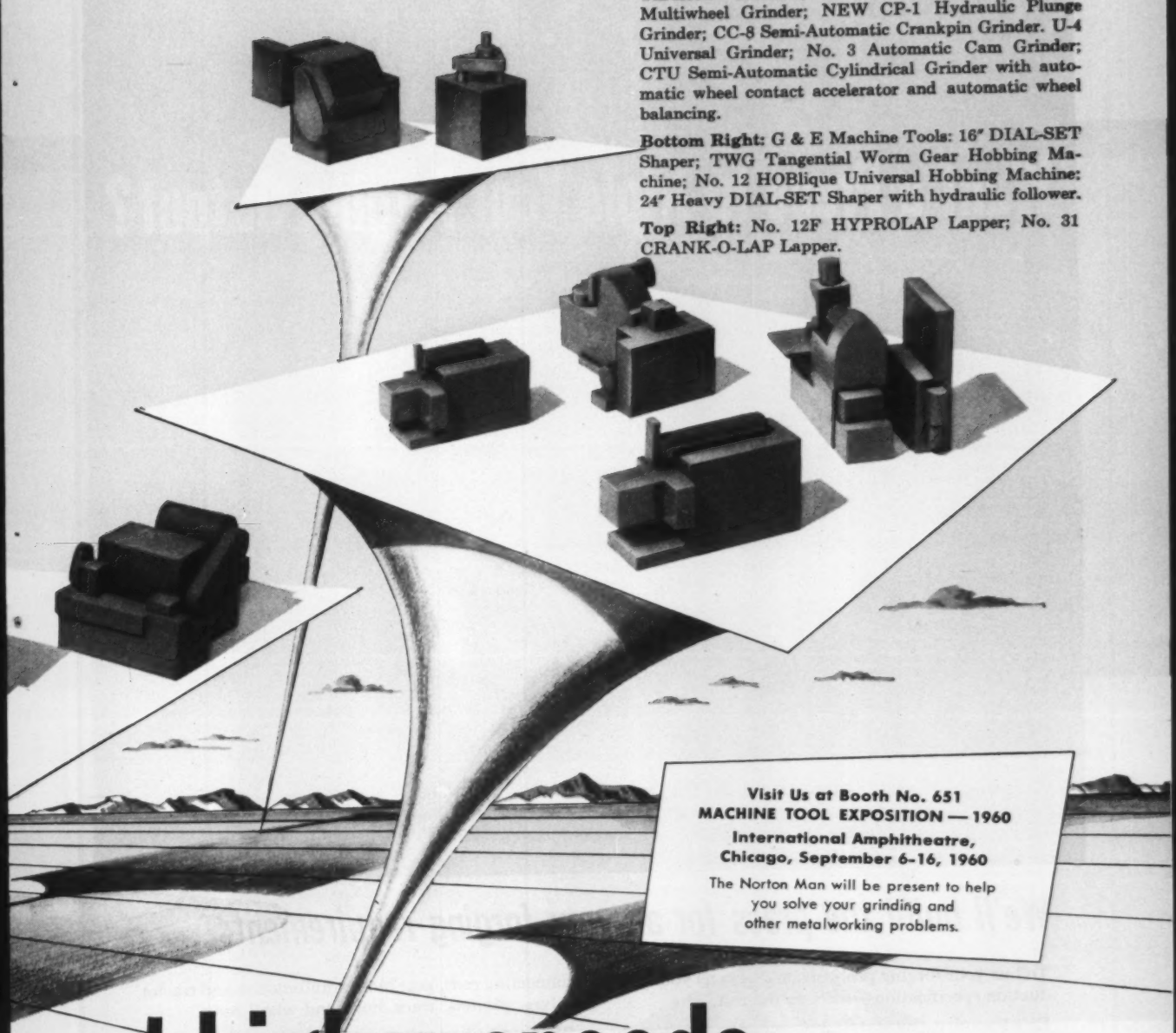
Precise production

See these new Norton Machines *in action* in Booth No. 651!

A *new* MULTI-WHEEL Grinder grinding main bearings . . . the *new* CC-8 CRANK-O-MATIC with automatic table indexing for crankpins . . . and the new No. 31 CRANK-O-LAP lapping all bearings and pins at one time . . . *all* on a three-machine transfer line.

See S-3 Hydraulic Surface Grinders running at **150 FPM** *for the first time.* The most efficient 15 H.P. cylindrical grinder, the PLUNGE-O-MATIC . . . a new Cutter and Tool Grinder with tilting wheel head for fastest set-ups on toughest jobs . . . and two brand-new Hand Surface Grinders with outstanding sizing and finishing ability.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals • BEHR-MANNING DIVISION:



Top Left: NEW No. 200 Cutter and Tool Grinder; NEW 6 and 10″ Type TS Hand Surface Grinders; NEW 6 and 8″ S-3 Hydraulic Surface Grinders.

Bottom Left: NEW No. 2 Centerless Plunge and Thrufeed Grinders; NEW CM-2 Semi-Automatic Multiwheel Grinder; NEW CP-1 Hydraulic Plunge Grinder; CC-8 Semi-Automatic Crankpin Grinder. U-4 Universal Grinder; No. 3 Automatic Cam Grinder; CTU Semi-Automatic Cylindrical Grinder with automatic wheel contact accelerator and automatic wheel balancing.

Bottom Right: G & E Machine Tools: 16″ DIAL-SET Shaper; TWG Tangential Worm Gear Hobbing Machine; No. 12 HOBlique Universal Hobbing Machine: 24″ Heavy DIAL-SET Shaper with hydraulic follower.

Top Right: No. 12F HYPROLAP Lapper; No. 31 CRANK-O-LAP Lapper.

Visit Us at Booth No. 651
MACHINE TOOL EXPOSITION — 1960
International Amphitheatre,
Chicago, September 6-16, 1960

The Norton Man will be present to help you solve your grinding and other metalworking problems.

at higher speeds

Plus other Norton exclusives like . . . *Automatic Wheel Contact Accelerator* to shorten grinding cycle and save dollars. *Ultra-Precise Wheel Balancing* in just five seconds! Automatic Face & Radial Truing device that perfectly blends face and radii, *without machining lines.*

AND THESE G & E MACHINES: 1. Two new DIAL-SET Shapers — *real time savers!* 2. New HOBlique Hi-Speed Gear Hobber — eliminates need for feed and lead change gears, lead screw, and differential.

In short, see how *you* can speed up your precision production. NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. *District Offices:* Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

NORTON
MACHINE TOOLS

75 years of . . .
making better products...
to make your products better

Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes • MACHINE TOOL DIVISION: Grinding and Lapping Machines — G&E DIVISION: Shapers • Gear Cutting Machines • Gear Induction Hardeners

Want a Press to Triple Your Forging Output?

We'll build the press for all your forging requirements . . .

Tell us your forging problems and give us your production specifications—we'll do the rest.

Erie Foundry, one of the first companies to automate forging, can provide specially designed *high volume* presses in capacities of 1000 to 8000 tons. Instead of the three machines and nine men formerly required, now you need only one Erie automated forging press and only one operator observer—to triple your present production rate! Trimming, too, can be accomplished in a single production cycle. With billet supply and finished part removal conveyorized, it is possible to achieve a production volume of, say, 1200 track-link forgings per hour.

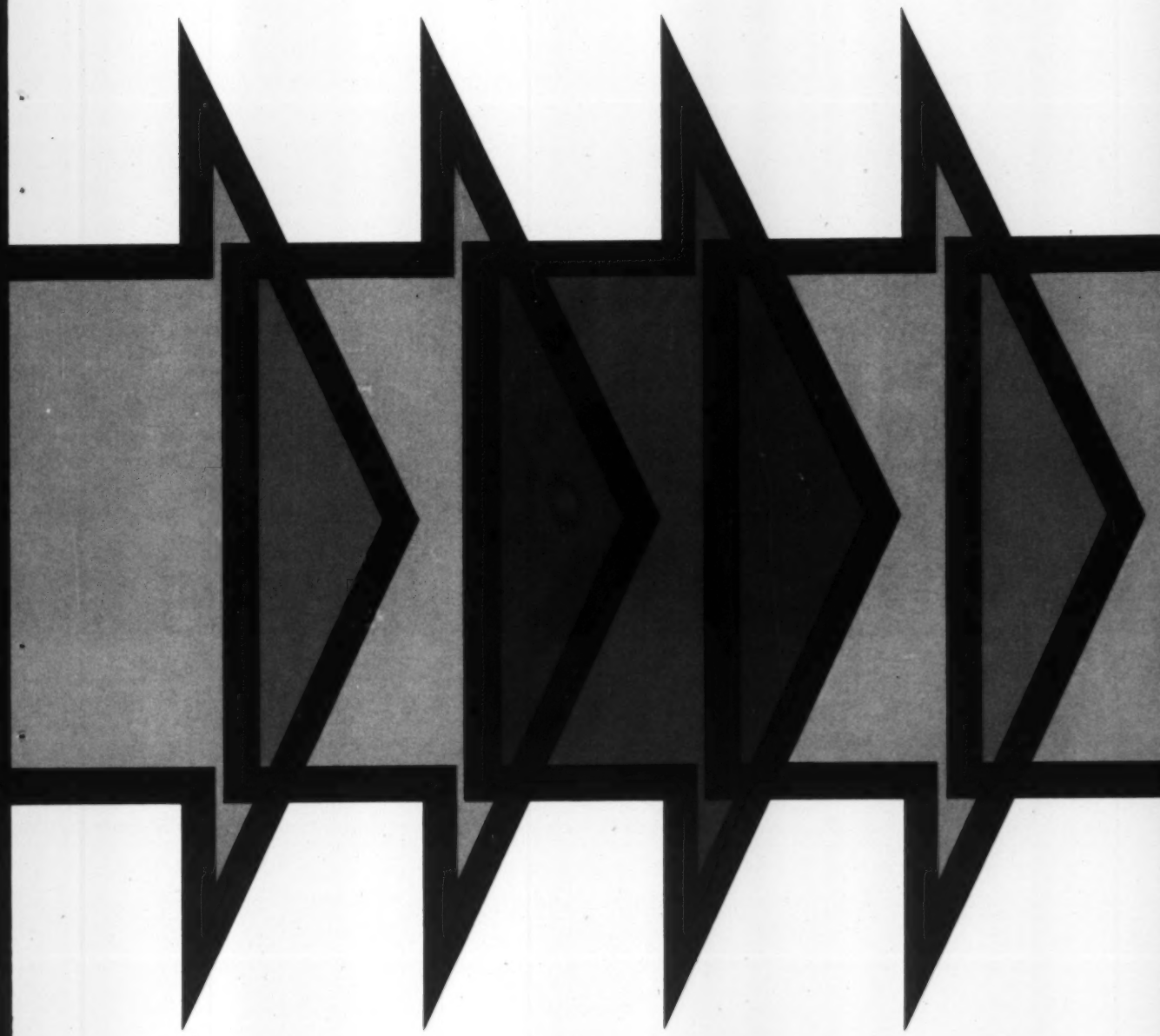
Erie Foundry has a complete line of machines designed for high volume production of such parts as connecting rods, gear blanks, automotive and tractor valves, pinions, track links and wheel hubs.

We would like to discuss application of automated presses to your production requirements. For the complete story, phone or write Mr. R. E. Sanford, Erie Foundry Company, Erie 2, Pa.

ERIE

ERIE FOUNDRY CO.

The world's great name in forging since 1895 EF-59-01



FROM GREAT LAKES STEEL

15 X-A-R 30

ABRASION RESISTANT STEELS

TWO NEW STEELS—HARDER FOR HARDER JOBS

X-A-R

ABRASION RESISTANT STEELS

HARD ENOUGH AND TOUGH ENOUGH TO LAST

Is abrasion your constant enemy? If your equipment meets materials as they're scooped, shoved, slid, pushed, dragged or dumped, does it face the recurring threat of downtime for repairs or replacement? To eliminate such maintenance headaches, Great Lakes Steel has developed two tougher, harder alloy steels—X-A-R 15 and X-A-R 30. They're supplied in hardnesses from 360 to 400 BHN (or, by agreement, in a range of hardness between 265 and 500 Brinell). And they're especially effective and economical in those critical bear-the-brunt areas of the equipment where wear is worst—liners, teeth, bars, blades and plates, for example. *Under conditions that commonly wear out equipment in a hurry, X-A-R abrasion-resistant steels outwear any other type of steel.*

Great Lakes Steel is a division of

WHERE MATERIALS COLLIDE WITH EQUIPMENT

Chemical composition alone is not the secret of low carbon X-A-R steels; their balanced combination of uniformity, high strength, hardness and toughness is the result of close control during heat-treating, quenching and tempering. This makes them more workable, too. Under normal welding and fabricating conditions use X-A-R 30. For *extremely* difficult problems, such as welding under cold conditions or extensive flame cutting, choose X-A-R 15.

X-A-R abrasion resistant steels are immediately available in ⅛″ to 1″ thicknesses, widths up to 72″ and lengths up to 35′. For technical information and supply sources, see next page.

X-A-R

A PRODUCT OF

GREAT LAKES STEEL

Detroit 29, Michigan

NATIONAL STEEL CORPORATION

15 X-A-R 30

TECHNICAL INFORMATION

CHEMICAL COMPOSITION

X-A-R steels are furnished at two specified carbon ranges. These are 14 to 20 carbon for X-A-R 15 and 25 to 30 carbon for X-A-R 30. The balance of the typical composition is:

Manganese	.80%	Chromium	.65
Phosphorous	.020	Molybdenum	.20
Sulphur	.028	Zirconium	.06
Silicon	.60		

TYPICAL MECHANICAL PROPERTIES

	At Brinell Hardnesses of: 363	400
Tensile Strength, psi	180,000	200,000
Yield Strength, psi	165,000	180,000
% Elongation in 2"*	17	16
% Reduction in Area*	56	55
Charpy V Impact at —75°F.	12 (Ft. Lbs.)	7

*Based on standard .505" specimen

ENGINEERING DATA

Resistance to Atmospheric Corrosion (Rural, Marine, and Industrial Environments)	3-5 times copper-bearing or carbon constructional steel
Compressive Yield Strength, psi	Approx. equal to Tensile Yield Strength
Ultimate Shearing Strength, psi	Approx. equal to Tensile Yield Strength
Modulus of Elasticity, psi	29/30,000,000
Endurance Limit (rotating beam)	60% of Tensile Strength
Coefficient of Expansion per °F.	70°F. to 200°F.—.0000062

FABRICATION

Cold Bend Test: Moderate bending can be performed within the usual range of hardnesses. For free bending, it is recommended that a mandrel be used not less than ten times the thickness of the metal through an angle of 90°.

Welding: Low hydrogen electrodes are recommended for welding X-A-R steels. The grade of electrode used is dependent on the strength requirement of the weldment.

Burning: X-A-R steels can be flame cut without pre-heating or stress relieving after cutting.

COMPLETE METALLURGICAL SERVICE

In addition to the information given in this folder, there is a great deal of detailed data available to steel users covering all characteristics of X-A-R steels. Furthermore, a thoroughly competent metallurgical service organization is available to work with you on any application problem you may have.

X-A-R STEELS ARE AVAILABLE AT THESE STEEL SERVICE CENTERS

BENEDICT-MILLER
Lyndhurst, New Jersey

JOSEPH DEMSEY COMPANY
Cleveland, Ohio

DUCOMMUN METALS & SUPPLY COMPANY
Los Angeles, California

INTERSTATE STEEL COMPANY
Evanston, Illinois

LOCKHART IRON & STEEL COMPANY
Pittsburgh, Pennsylvania

MARSH STEEL & ALUMINUM COMPANY
Kansas City, Missouri

O'NEAL STEEL, INCORPORATED
Birmingham, Alabama

SALT LAKE HARDWARE COMPANY
Salt Lake City, Utah

A. C. LESLIE & COMPANY, LIMITED
Montreal, Canada

15 X-A-R 30
ABRASION RESISTANT STEELS

See these 'Buffalo' Production-Boosters IN ACTION at the Machine Tool Exposition...Booth 551

NEW HOLLOW SPINDLE DRILLING MACHINES HANDLE FORMERLY "IMPOSSIBLE" JOBS! RPMster's famous variable speed drive plus NEW hollow spindle for drilling "exotic" metals!

Read These Amazing Test Results:

316 Stainless Steel
¾" drill @ 700 rpm .001" feed — 4" deep.
½" drill @ 900 rpm .001" feed — 4½" deep.

Tool Steel Shear Blades Hardened to 54 Rc.
½" drill — 800 rpm .001" feed — 2½" through.

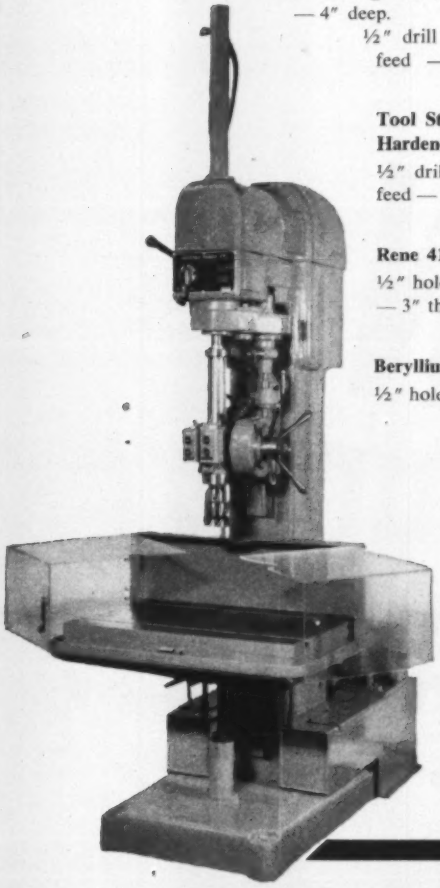
Rene 41
½" hole @ 750 rpm .001" — 3" through

Beryllium Bronze
½" hole @ 6200 rpm hand feed through 2½" in 1½ seconds.

Titanium
⅜" hole @ 1000 rpm .002" feed.

Cast Iron
¾" hole @ 2000 rpm .004" feed.

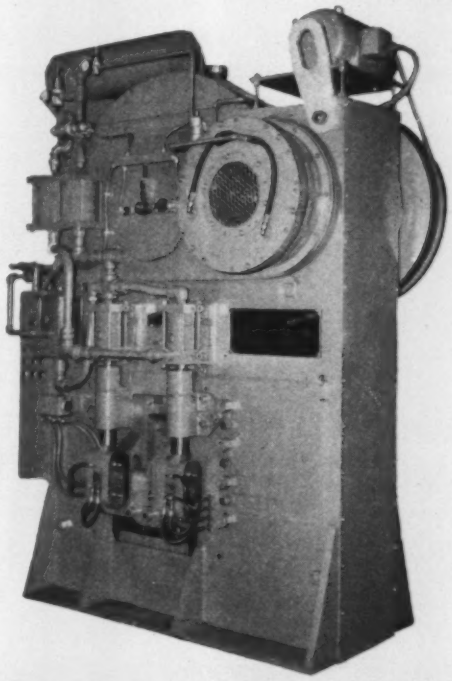
52-100 Alloy Steel
7/16" hole @ 800 rpm .001" feed.



NEW! FAST! 'BUFFALO' 400 BILLET SHEAR. Up to 18,000 cuts per 8-hr. shift . . . that's **Real** production! Makes clean, square cuts!

SPECIFICATIONS:

Ram tonnage	400 tons
Strokes per minute (free running)	60
Round Billets, mild steel	4 ½" dia.
Square Billets, mild steel	4" sq.
Flat bars	12" x 2"
Knife size	3" x 7½" x 13"
Motor horsepower	20 HP Normal
Maximum round or square size without modification	5" sq. or round
Machine stroke	2"
Machine, net weight	32,000 lbs.
Length x Width x Height	80½" x 52" x 116½"



There'll be action a-plenty at Booth 551, Machine Tool Exposition! Besides these two **new** 'Buffalo' units, you'll see demonstrations of other Quality-Built 'Buffalo' Machine Tools: the No. 18 Hollow Spindle Drill, the famous Universal Iron Worker that does seven different jobs on one machine, and one of our line of improved Bending Rolls.

We'll be looking for you at the show! (If you can't wait for the MTE for full facts on these machines, contact your 'Buffalo' representative . . . or write us direct.)

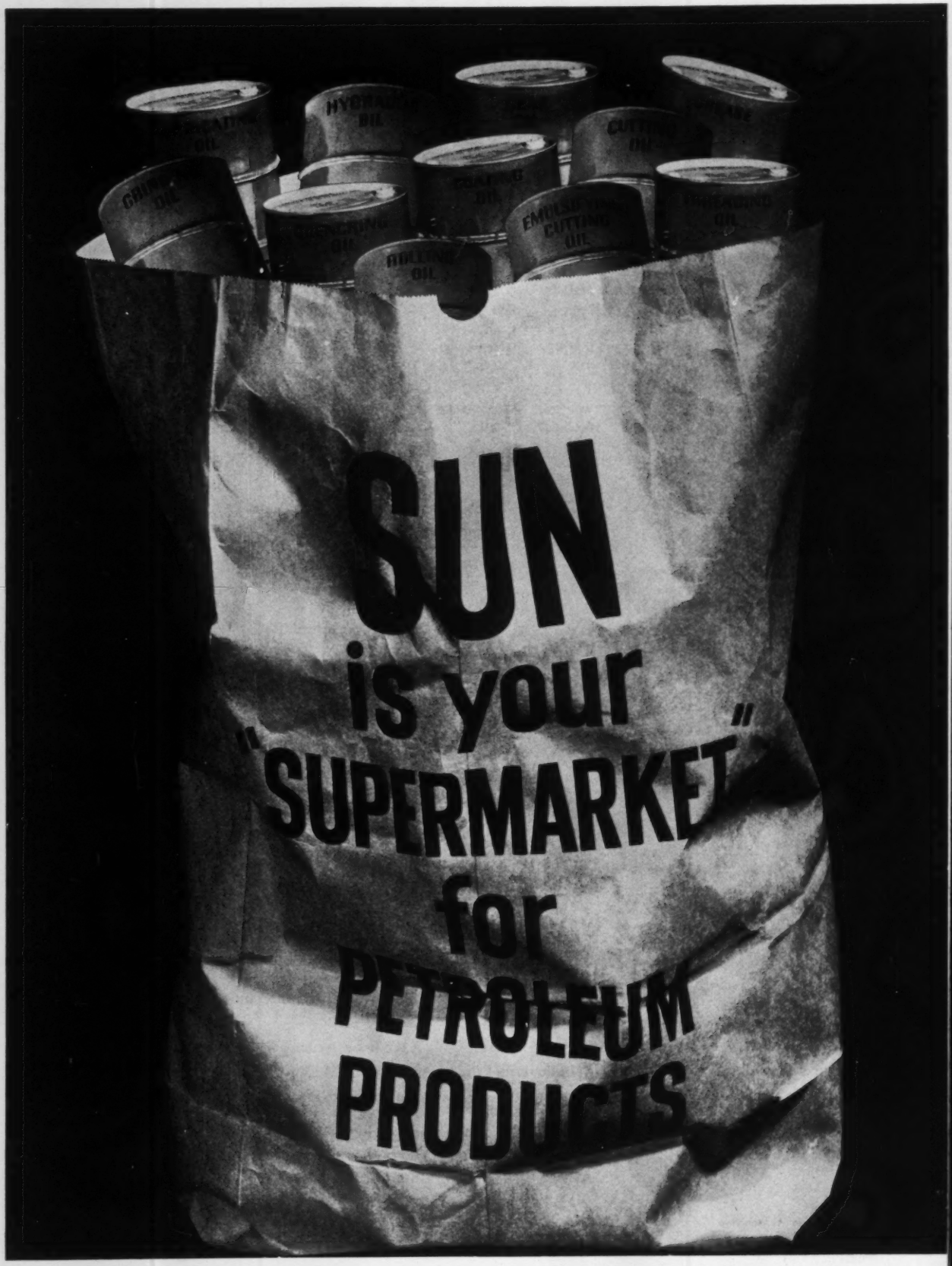
MACHINE TOOL DIVISION
BUFFALO FORGE COMPANY
Buffalo, New York
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.


SUN
is your
"SUPERMARKET"
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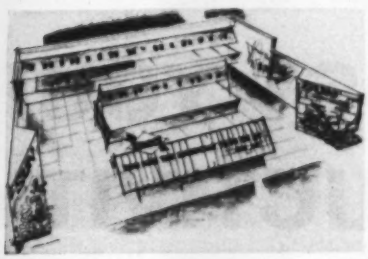
PETROLEUM
PRODUCTS

Does it make sense to shop around for petroleum products when you can get the best of everything from one source? Not when you can save time and money by dealing at Sun's "Supermarket," a single source of hundreds of quality petroleum products.

Your local Sun man is a human encyclopedia of technical know-how based on research and experience. He'll give you all the technical help you need.

You'll like dealing at the Sun "Supermarket"... where quality has been established as the best economy of all. Call your local Sun man, or write SUN OIL COMPANY, Philadelphia 3, Pa. In Canada: Sun Oil Company Limited, Toronto and Montreal.



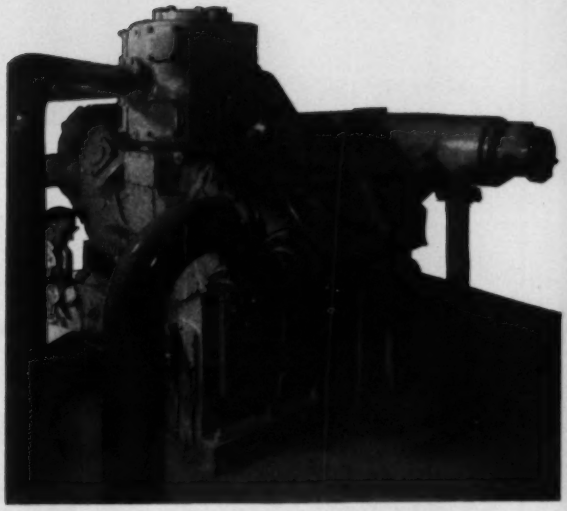
Be sure to visit the Sun exhibit at the Machine Tool Builders Show in International Amphitheatre, Chicago, Illinois. Sept. 6-16. Booth 1513.

SUNOCO

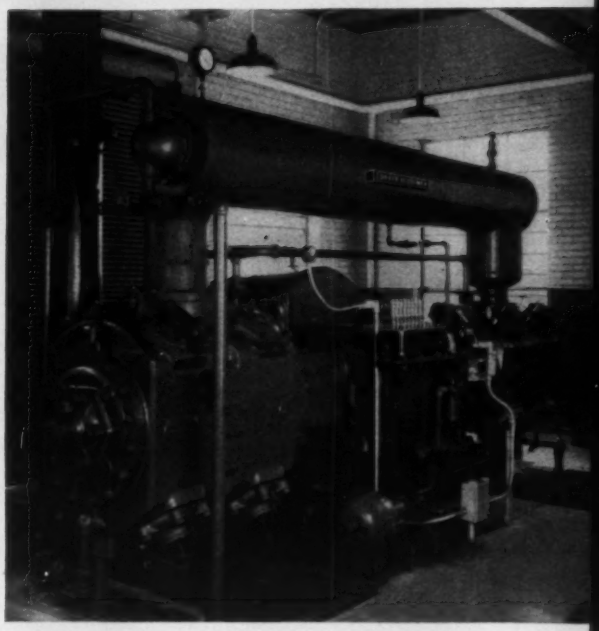
ORIGINATORS OF CUSTOM-BLENDED BLUE SUNOCO GASOLINES

George Edick, *Domestic Sales Manager, The Cooper-Bessemer Corporation, and* Floyd Paschke, *Sales Manager, The Rotor Tool Company, explain...*

HOW TO BOOST YOUR PRODUCTIVITY WITH COMPRESSED AIR



Installing a Cooper-Bessemer DMR-3 Air Compressor for foundry service. Capacity is 1670 cfm at 110 psig discharge. Other units available for service down to 572 cfm.



Cooper-Bessemer Model EM Air Compressor in a metal-working plant. Rated 1125 cfm at 110 psig discharge. Other models in ratings up to 10,000 hp.

The thing that counts in getting top output with air tools is *air pressure at the tool, under load.* Is this productivity what it should be in *your* plant? Here is a service that helps you find out *for sure* . . .

The teaming up of application service engineering of Cooper-Bessemer and its new subsidiary, Rotor Tool, provides full-scope experience to help you analyze your compressed air needs and plan your facilities for optimum production efficiency. This experience encompasses the study of compressor capacity requirements, number of compressors and their location for greatest economy, regulation of the plant, the distribution system and portable air tools. This service is yours without obligation.

It will pay you to call in the nearby application engineer of Cooper-Bessemer or Rotor Tool to help you make sure that you are getting maximum productivity with compressed air.

BRANCH OFFICES: Grove City • New York • Washington • Gloucester
Pittsburgh • Chicago • Minneapolis • St. Louis • Kansas City • Tulsa
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Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

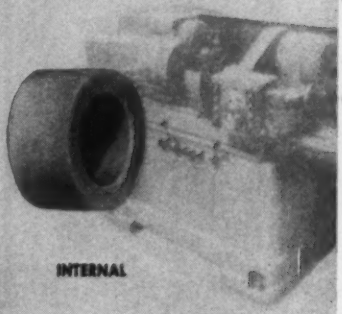
ENGINES: GAS - DIESEL - GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL,
ENGINE, TURBINE OR MOTOR DRIVEN

Precision-engineer

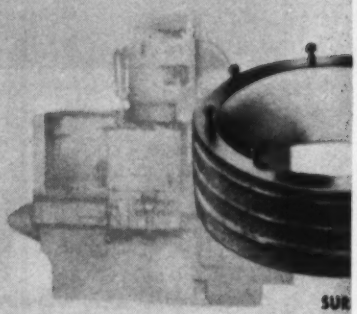
MATCH THI

THE WORLD'S F

CYLINDRICAL



INTERNAL



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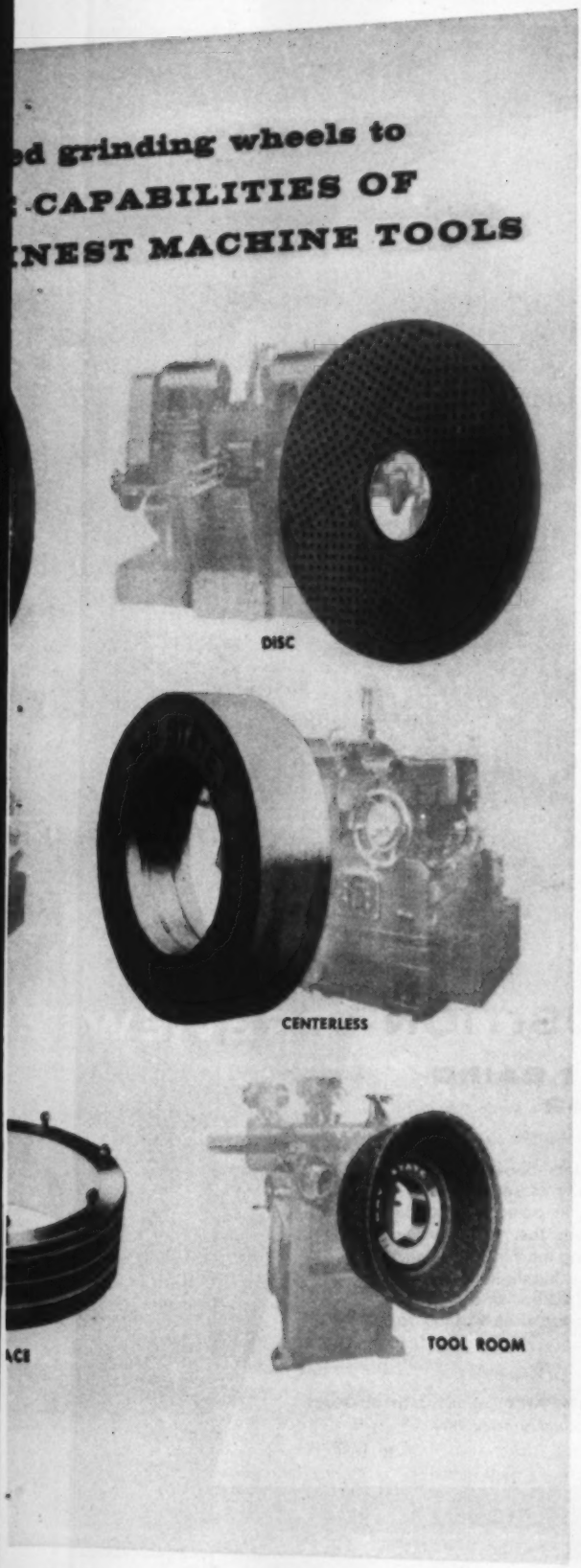


BAY STATE ®
WHEELS of PROGRESS

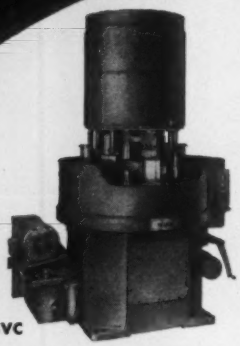
Bay State salutes the tremendous technological achievements of the Machine Tool Industry and joins with the industry in offering to users of machine tools the finest grinding equipment in the world. Working in close association with many of the foremost tool manufacturers Bay State, too, has built an outstanding reputation for technological advancement. Through vigorous and carefully planned programs of product development and research into entirely new materials and techniques, Bay State today is able to offer industry wheels for every known type of grinding operation . . . wheels that assure *"better grinding at lower cost."*

BAY STATE ABRASIVES

Bay State Abrasive Products Co.,
Westboro, Massachusetts
In Canada: Bay State Abrasive
Products Co., (Canada) Ltd.,
Brantford, Ontario.

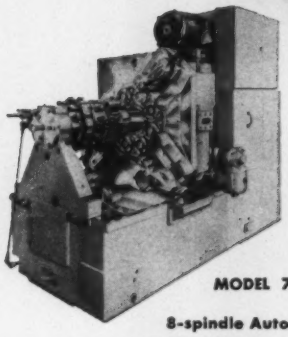
BAY STATE ®
WHEELS of PROGRESS

Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.



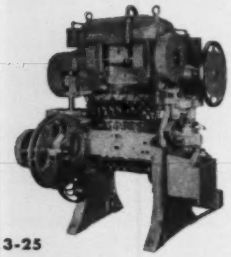
MODEL 84VC

Vertical Continuous Lathe
Remarkable New Improvements!



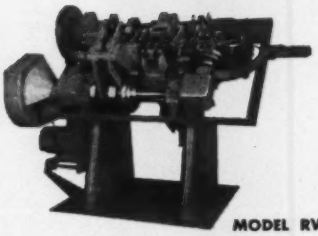
MODEL 78-H

8-spindle Automatic Multiple Chucking Machine
Important New Changes!



MODEL 3-25

Transfer Press for the High Production of Stamped and Drawn Parts
Many New Features!



MODEL RWI-1

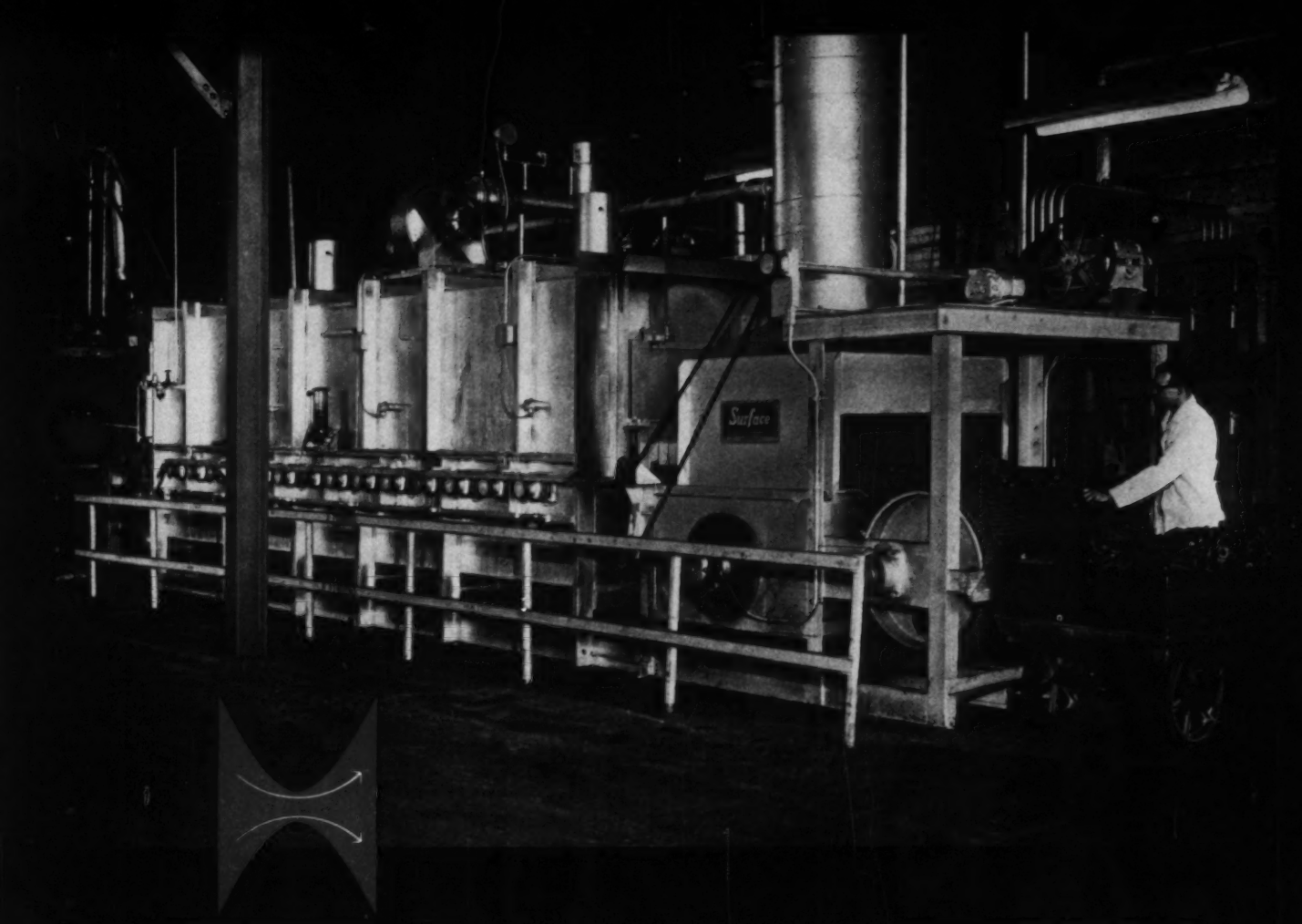
Ribbon and Wire Inclinable Forming Machine
All New!

MACHINE TOOL EXPOSITION PREVIEW

BETTER STOP AT BAIRD BOOTH 1142

Your visit to the Machine Tool Builders' Show will not be complete if you miss the opportunity of seeing these 4 Baird high production performers in actual operation. The just-introduced RWI-1 represents the most startling innovation in ribbon and wire forming machinery in years ... important new design changes highlight the well-known Baird Transfer Presses, Chuckers and Vertical Continuous Lathes. We have a few surprises waiting for you, too!

BAIRD **THE BAIRD MACHINE COMPANY** • Stratford, Conn.
Builders of High Production Machinery since 1846



SURFACE POWER CONVECTION EQUIPMENT cuts Ross Gear forging process time 50%

High speed, high volume air circulation is the feature of this Surface continuous draw furnace, which enabled Ross Gear and Tool Company, Lafayette, Indiana, to

(1) process a wide variety of steering gear forgings much faster than with the batch type furnaces replaced. These forgings range from a few ounces to 22 pounds.

(2) draw forgings at rates to keep up with production in hardening operations.

(3) reduce handling operations, consequently reassign personnel to more productive jobs.

The furnace has three separately controlled zones, each with its own burners and fan. The uniformity of furnace temperature from zone to zone is consistently held within ±5°F.

Mr. Leonard Ewalt, Chief Metallurgist of Ross Gear, reports: "The furnace will heat through a 2-inch section in approximately 40 minutes—just about as fast as the metal can take it when heated by convection . . . I would say that with this method of distributing heat in the zones and the rapid heating rate, this Power Convection furnace* is a couple of years ahead of its time.

We're not waiting for tomorrow, either. We're getting results today."

Write for bulletin SC-182. Surface Combustion, 2385 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ont.

*Trademark of Surface Combustion, Division of Midland-Ross Corp.

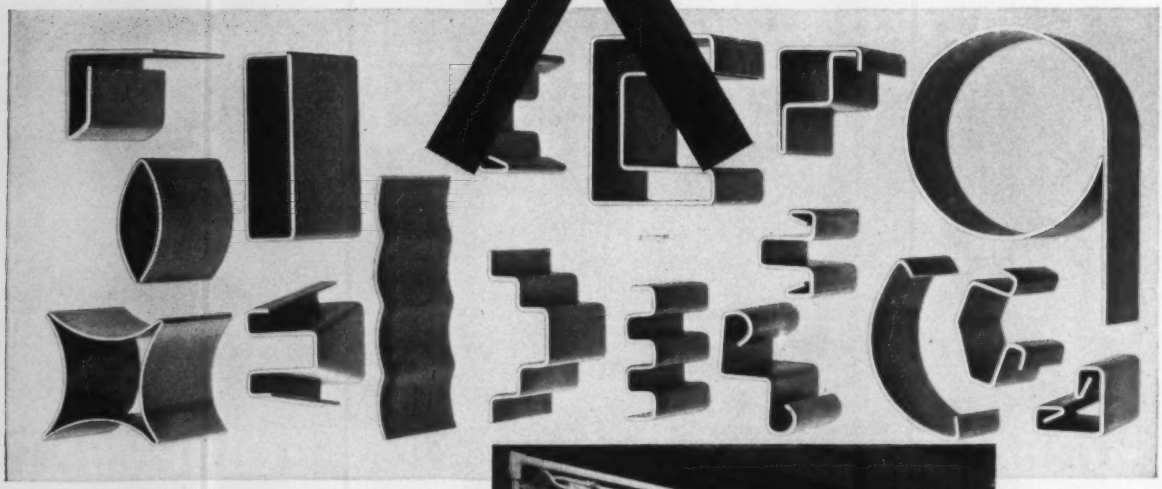
Surface

A division of Midland-Ross Corporation

MR

SENSATIONAL form-all

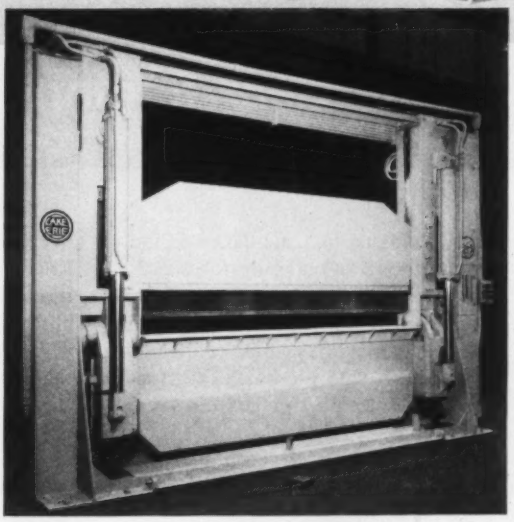
Power models to be first shown at the Machine Tool Exposition



Short sections of typical pieces produced with Form-All.

FORMS SHEET AND PLATE WITHOUT DIES

produces "impossible" one-piece shapes



Hand—Air—Hydraulically Operated Models; capacities from 2 ft. x 16 ga. to 16 ft. x 3/4 in.

LAKE ERIE HYDRAULIC PRESSES

SEE HOW IT WORKS **BOOTH 542**

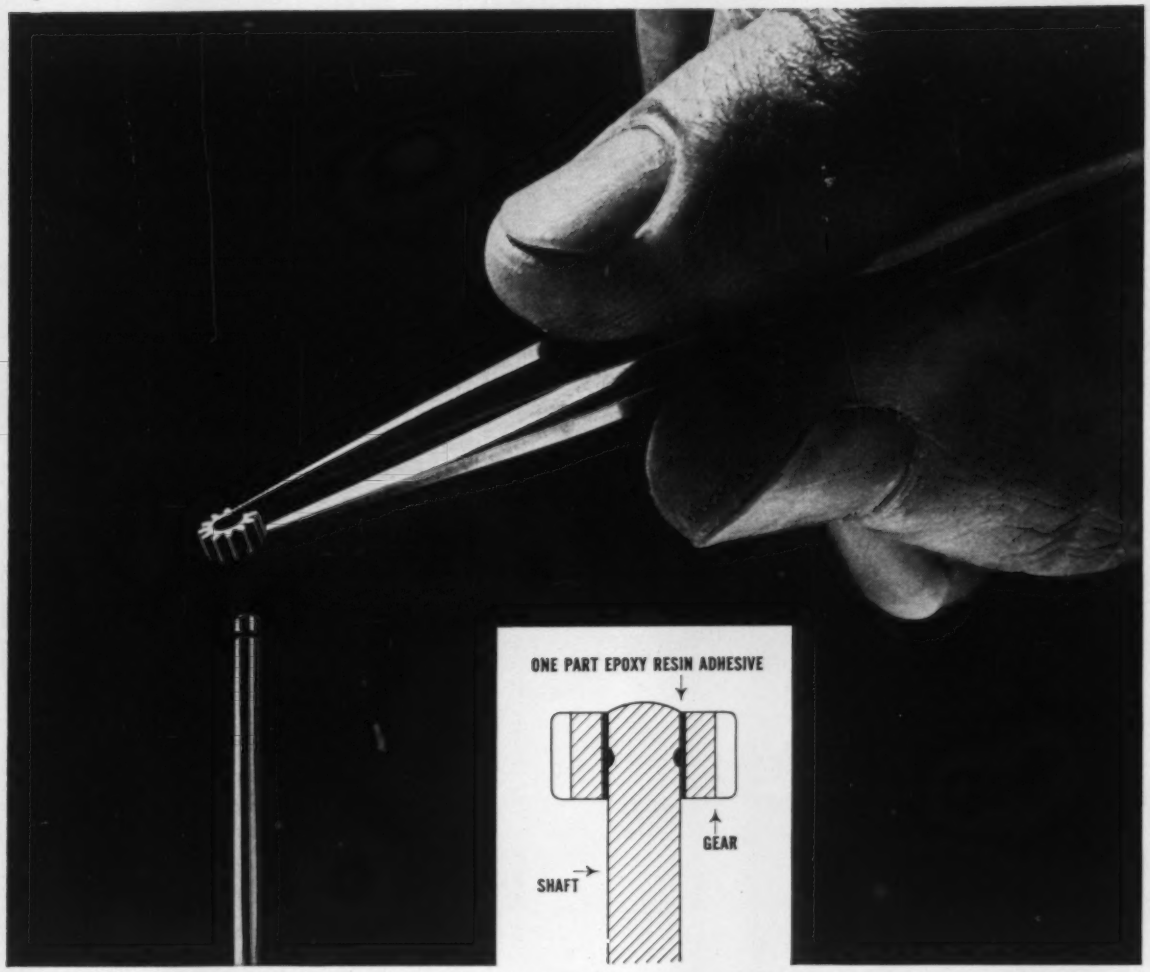
The Machine Tool Exposition International Amphitheatre

LAKE ERIE *machinery corporation*

882 Woodward Avenue, Buffalo 17, New York

NEW YORK • DETROIT • CHICAGO • LOS ANGELES

Complete Engineering and Manufacturing Facilities for Designing and Building Highly Specialized Hydraulic Presses



How fabricating with SCOTCH-WELD® BRAND Structural Adhesives eliminated 100% inspection step

Timing components now being fabricated with SCOTCH-WELD Adhesive EC-1386 meet precise specifications. The Haydon Division, General Time Corp., Torrington, Conn., is using this one-part epoxy resin base adhesive to bond small pinion gears to rotor shafts in a sub-assembly timing gear operation.

Prior to use of EC-1386, the parts were joined by brazing. But the high heat required affected the material hardness. It also produced shaft distortion, necessitating a 100% inspection step.

Then SCOTCH-WELD Adhesive EC-1386 was used. The high heat previously required was eliminated. With the end of this trouble source, shaft concentricity and material hardness were left unaffected, the 100% inspection eliminated. Close tolerance requirements between shaft and gear were also eliminated because of void-filling properties of the adhesive. A savings of $56.37 per thousand assemblies resulted.

Company after company is discovering how to save money, speed production and eliminate rejects by using SCOTCH-WELD Structural Adhesives in the fabrication of their products. Perhaps these adhesives are at work right now in operations similar to yours. Find out! For free literature without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept. SBE[illegible] St. Paul 6, Minnesota. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.

ADHESIVES, COATINGS AND SEALERS DIVISION

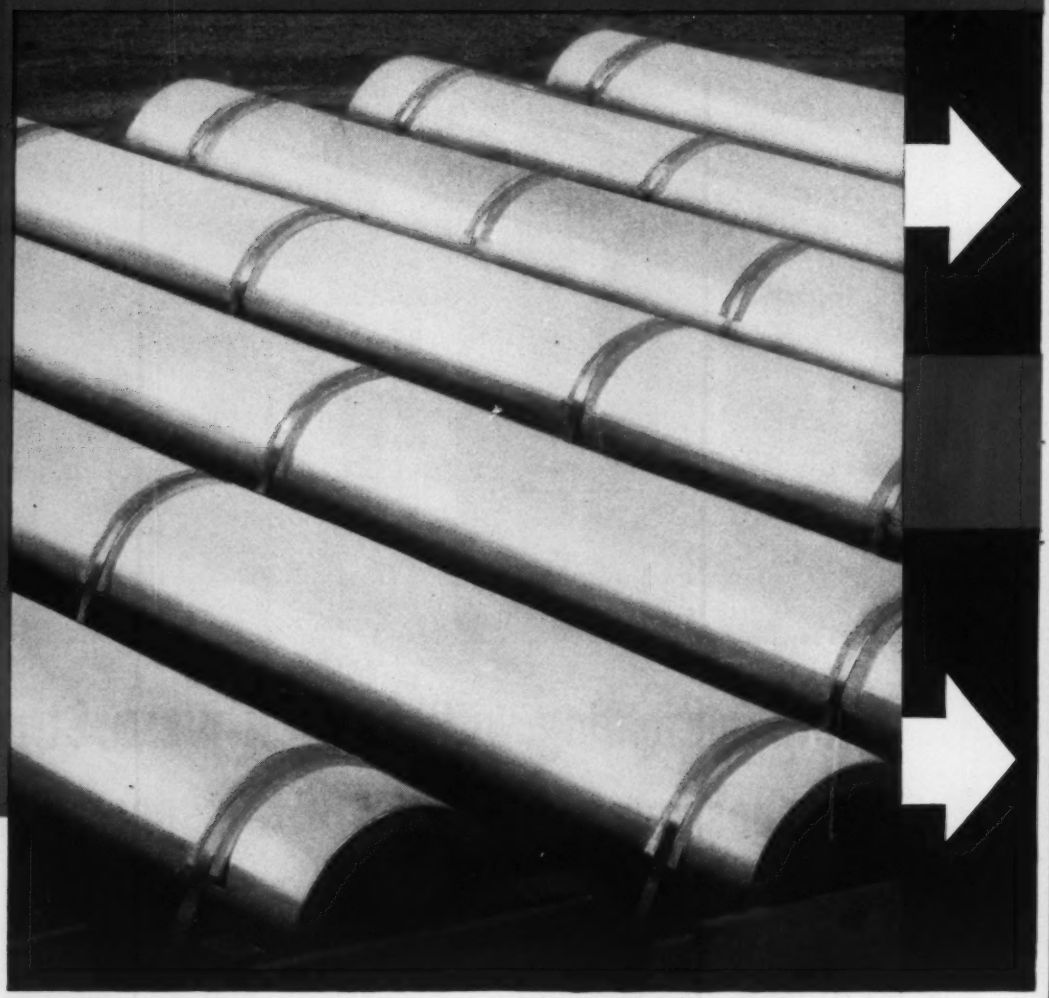
MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

new nuclear plants choose

FULFILLS THE EXACTING HEAT EXCHANGERS



Centrifugal stainless steel castings readied for shipment by U.S. Pipe

The Government's new SPERT III nuclear plant at the National Reactor Station near Idaho Falls, Idaho, operating since December, 1958 to study nuclear reactor safety, uses U.S. Pipe's centrifugally cast stainless steel pipe for its coolant system.

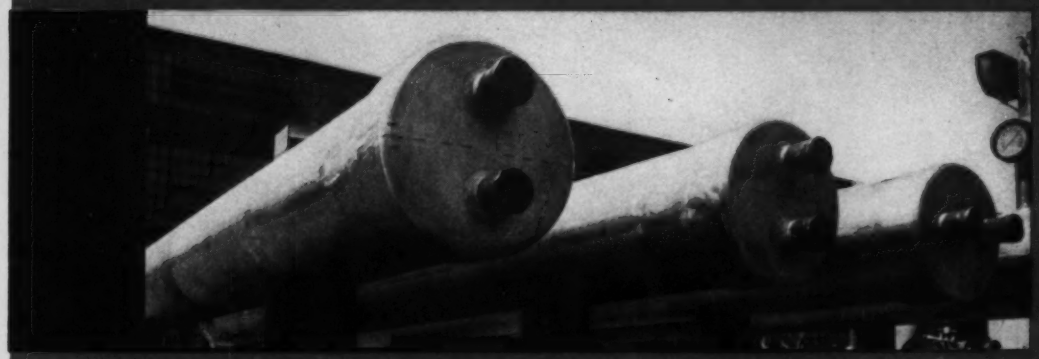
SPERT III is classified as a high pressure, high temperature, light water moderated and cooled reactor. Its versatility permits transient tests under various initial conditions of pressure, temperature, and coolant flow. For example, pressures ranging from atmospheric to 2,500 psi and water temperatures from 68° to 668° F.

Another new nuclear power plant, engineered and constructed by Stone & Webster for Yankee Atomic Electric Company, is using centrifugally cast stainless steel heat exchanger shells made by U.S. Pipe and fabricated by the Southwestern Engineering Company in Los Angeles, Calif.

Stainless steel, centrifugally cast, made to rigid specifications, may be the answer to your piping or heat exchanger problem. For more information, write or call:

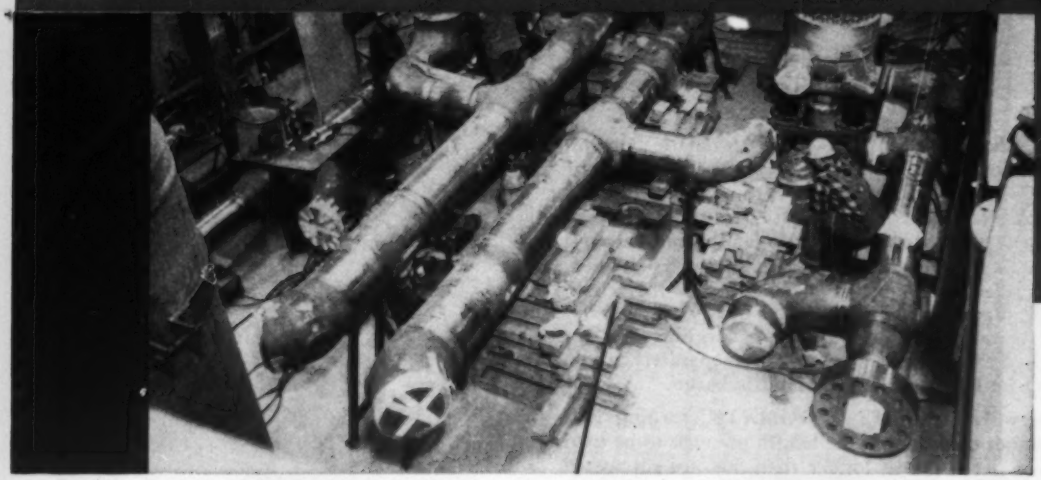
centrifugally cast stainless

REQUIREMENTS OF NUCLEAR AND COOLANT SYSTEMS



Shop-fabricated heat exchanger shells of centrifugally cast stainless steel ready for shipment to the Yankee Atomic Electric plant at Rowe, Mass.

Subassemblies of primary coolant piping of centrifugally cast stainless steel being installed in SPERT III.



ASA PRESSURE PIPING CODE STATUS

Approval has been granted under this code for the use of centrifugally cast austenitic pipe for nuclear piping by Nuclear Case N-9. This case appeared in the April, 1960 issue of MECHANICAL ENGINEERING. Reprints on request.

UNITED STATES PIPE & FOUNDRY CO.

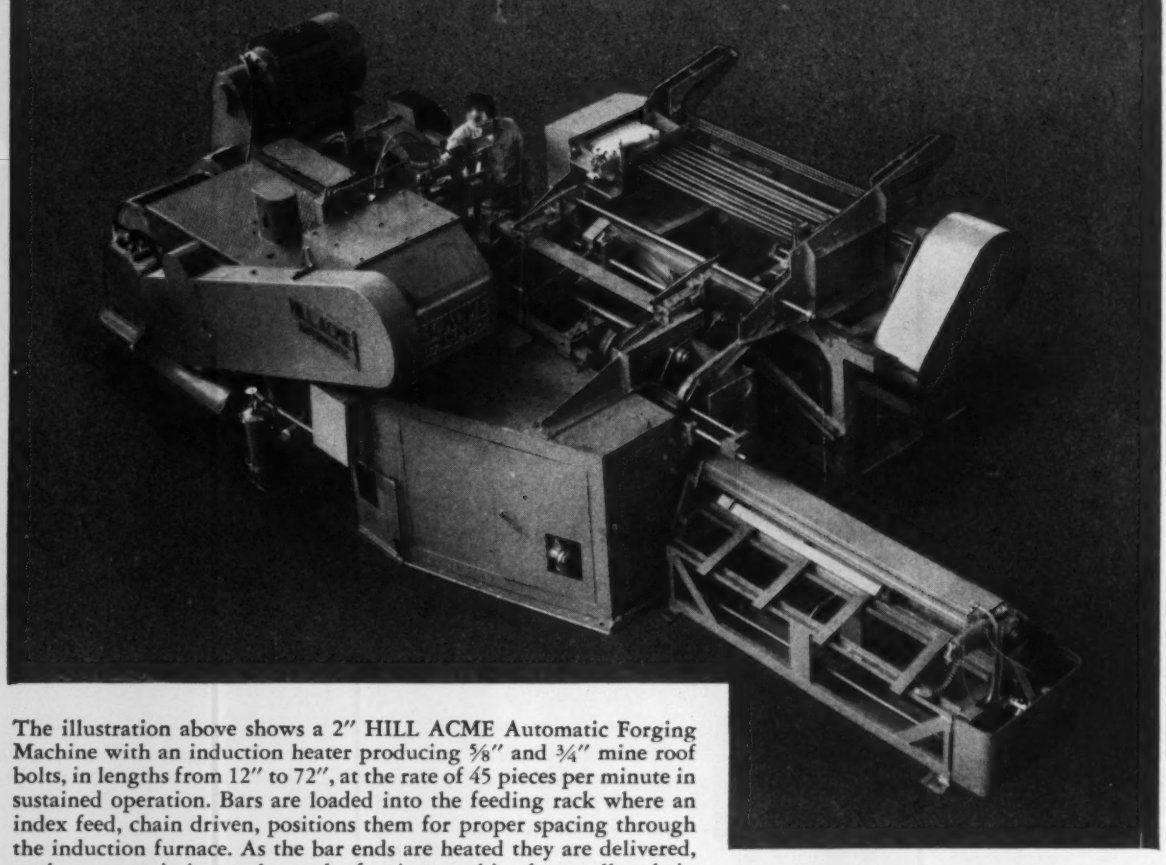
Steel and Tubes Division

STEEL & TUBES · U.S. PIPE · DIVISION

BURLINGTON, NEW JERSEY

SALES OFFICES: BURLINGTON, BOSTON, BIRMINGHAM, CHICAGO, CLEVELAND, DALLAS, LOS ANGELES, NEW YORK, PITTSBURGH, SAN FRANCISCO

Fully Automatic
FORGING MACHINE
DELIVERS 45 PIECES PER MINUTE!



The illustration above shows a 2" HILL ACME Automatic Forging Machine with an induction heater producing ⅝" and ¾" mine roof bolts, in lengths from 12" to 72", at the rate of 45 pieces per minute in sustained operation. Bars are loaded into the feeding rack where an index feed, chain driven, positions them for proper spacing through the induction furnace. As the bar ends are heated they are delivered, at the proper timing cycle, to the forging machine by a roller chain feed where they are gauged for length, picked up by fingers and passed progressively through the dies. Finished forgings are discharged from the back of the machine by means of a separately driven conveyor, arranged for both right and left hand discharge.

The design of this new HILL ACME AUTOMATIC forging unit does not limit the number of passes or the length of stock to be used in forging a variety of parts. Pieces longer than 36" are supported by a walking beam through the various passes.

HILL ACME AUTOMATIC forging machines are built in 1¼" to 5" capacities all of which can be automated. Your inquiry concerning high speed automatic forging equipment will receive prompt attention.

MMT-PE

The HILL ACME Company

1207 W. 65th STREET • CLEVELAND 2, OHIO

Manufacturers of: "ACME" FORGING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • ROTARY SHEARS • BAR-BILLET SHEARS • "HILL" GRINDING AND POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "CLEVELAND" KNIVES • SHEAR BLADES • MATERIAL HANDLING EQUIPMENT

Chicago Gear Mfg. Company tames tough steels, cuts costs with STANICUT Oil 208 BCS

Tames tough steels. Gears from one to 300 inches in diameter are machined by Chicago Gear. Steels up to 375 Brinell hardness are worked. STANICUT Oil 208 BCS helps them do it. STANICUT 208 contains maximum amounts of sulfur, chlorine and compounding for handling tough alloy steels. It is viscous enough to stay on tools and work, yet fluid enough for good cooling.

Cuts costs. STANICUT Oil 208 BCS is used at Chicago Gear for all gear hobbing operations and applications requiring a straight cutting fluid. There's no chance of the wrong fluid being used, thus no costly losses. One fluid cuts down inventory, saves time in keeping track of stocks, cuts paper work and ordering.

Gets service. Standard Oil's Dick Erickson is assigned to the Chicago Gear account. With a mechanical engineering degree from Purdue, plus several years' lubrication experience, Dick knows how to help a customer, knows how to supply technical help where it counts. Could STANICUT Oil 208 BCS and Standard Oil technical service help you? Ask about them at the Standard Oil office near you anywhere in the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

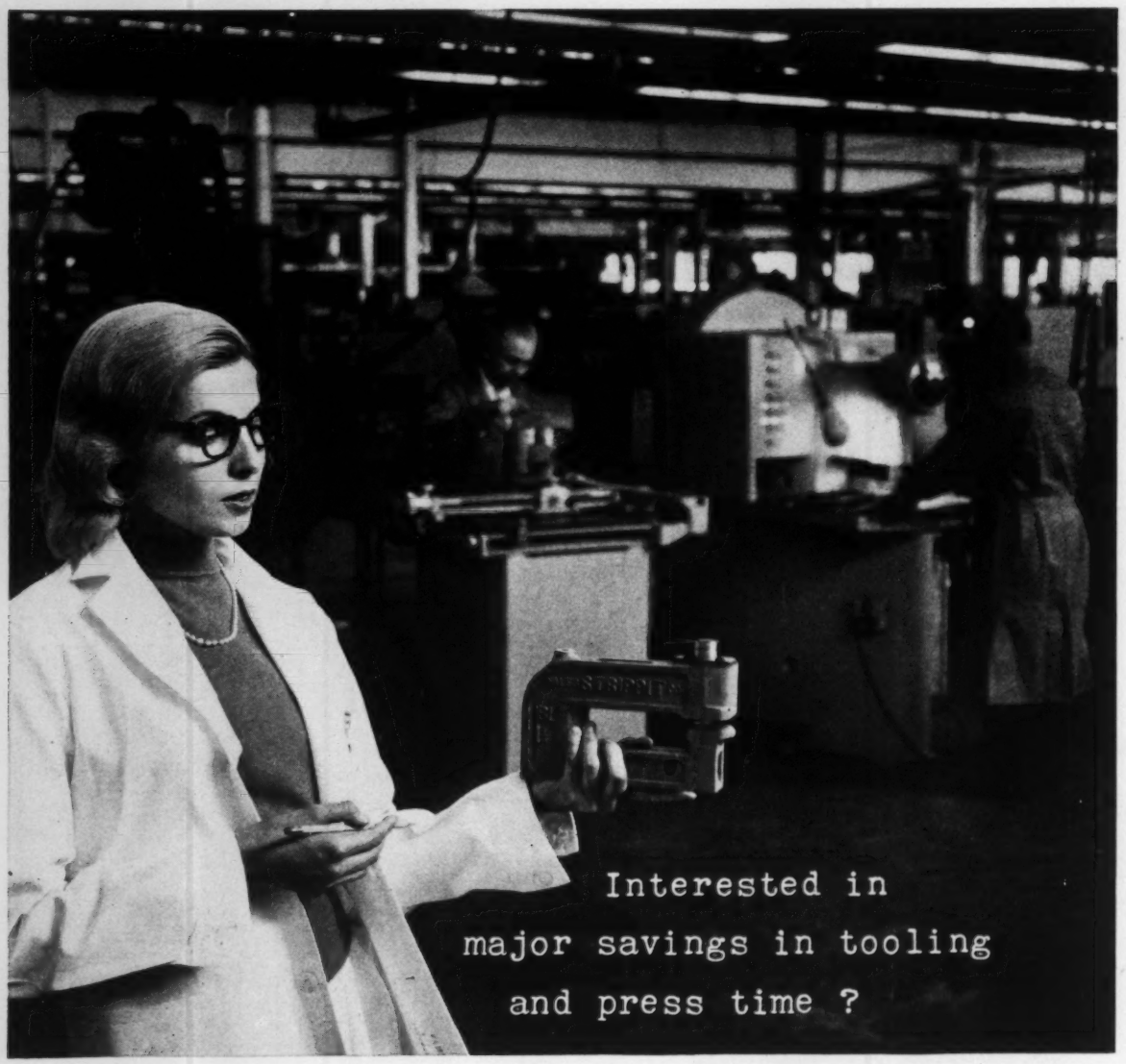
STANDARD

You expect more from Standard and you get it!

Quick facts about
STANICUT Oil 208 BCS

- Contains maximum amounts of sulfur, chlorine and compounding.
- Viscous enough to stay on large tools; fluid enough to flow easily, give good cooling.
- Can be used straight or diluted.
- Will not separate, become rancid or develop deposits.
- Non-irritating, non-corrosive, non-toxic.

Chicago Gear president Bob Weber (right) and Standard's Dick Erickson talk over cutting oils in front of company's new Pfauter P-2500 gear machine. Machine uses only STANICUT Oil 208 BCS cutting fluid.



Come to STRIPPIT - Booth 340 at Chicago's Navy Pier

You'll get a fresh slant on ways to work metal when you visit the Production Engineering Show in September. Stop by the STRIPPIT booth and see how our self-contained punching units eliminate expensive dies, how the Flex-O-Drill sharply reduces template making time, how our versatile Fabricators simplify pilot and production runs. SELF-CONTAINED HOLE PUNCHING UNITS reduce tooling to a simple assembly operation. Punches, stripping guides and die buttons are component parts of the unit. Nothing's attached to press ram. No die set required!

STRIPPIT FLEX-O-DRILL (left) speeds production of accurate templates and layouts. A table-top precision machine for drilling, reaming, center punching and scribing, Flex-O-Drill does away with need for base-line drawings or vernier height gauges. Handles ¼″ material up to 24″ wide and in any length. STRIPPIT MODEL 15A FABRICATOR (right), the latest model of one of industry's most versatile sheet metalworking machines, features the new Strippit Electro-Hydramatic Head for controlling the stroke. The time-saving Fabricator punches any sheet material up to ¼″ thick, notches and nibbles up to ⅛″ thick material.

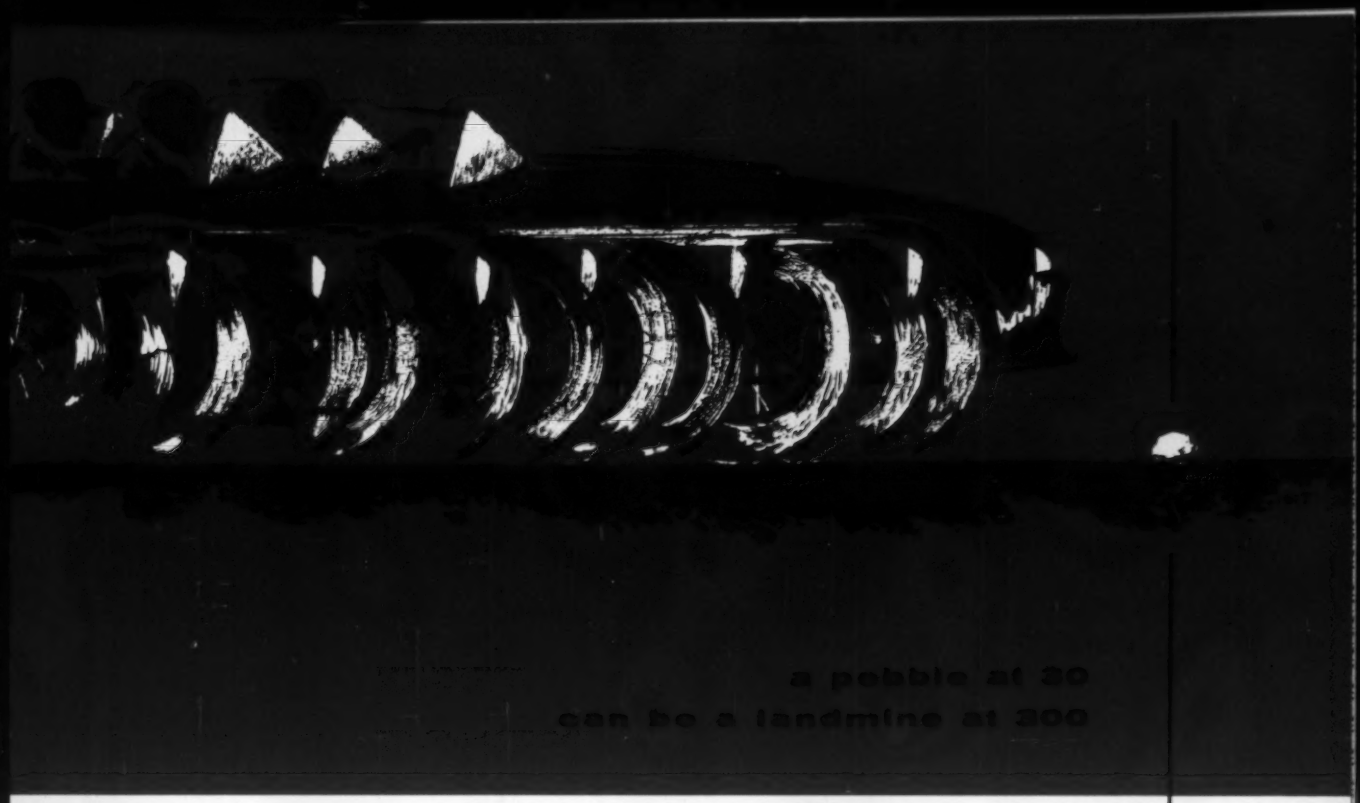
If you can't make the show, be sure to write for the General Catalog explaining the STRIPPIT System.

HOUDAILLE INDUSTRIES, INC.

WALES **STRIPPIT** INC.

210 Buell Road Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario; In Continental Europe: Raskin, S.A., Lausanne, Switzerland; In the British Isles: E.H. Jones, (Machine Tools) Ltd., Hove, Sussex, England.



the harder you drive for
super speed production
the more you need safe-
guards offered you in...

SCOVILL ®

brass

copper

aluminum

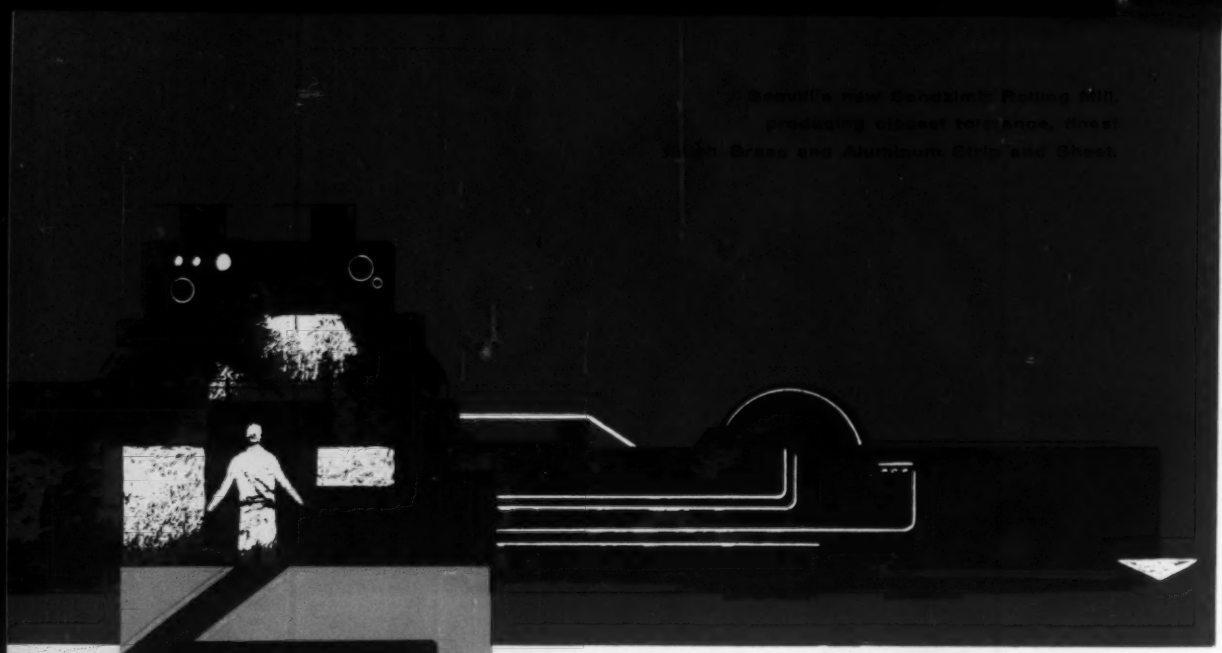
MILL PRODUCTS

MADE IN USA

. . . and made better to bring out the ***BEST*** *in your products*

Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn. Phone PLaza 4-1171

3SC60



SCOVILL®

features
to help you take
full advantage
of today's
high speed
methods and
machines

Metal soundness and uniformity — For more than 20 years, unique Scovill *continuous casting* machines have been supplying a major part of the cast brass bars and billets used to produce strip, sheet, rod, wire and tube . . . over two billion pounds of metal that is inherently sounder and more uniform in every respect. This means fast running capability, minimum down-time and rejects, better quality products.

Close-tolerance specifications — Modern high-speed fabricating equipment is increasingly intolerant of what once were considered minor variations in grain size, temper, dimensions, surface finish. Scovill advanced engineering and quality-control procedures, working with new close-tolerance production equipment, meet or exceed the demands of highest-speed fabrication.

Selection of the right alloys — Scovill Metals Research maintains a continuing program of research into the practical needs of mill products fabricators. Scovill's broad range of alloys permits recommendation of exactly the right properties and qualities for a given job.

The industry's most advanced packaging — Packaging of Scovill Brass, Copper and Aluminum Mill Products can make a specific contribution to speed and efficiency in your operations . . . save you handling time and space in storage . . . cut production down-time and start-up. Scovill innovations include extra-long-run coils; Fast-Feed wire packages; easy-to-handle bundling or boxing of rod and tube.

Any fabricator who has made Scovill a part of his competitive team knows that these are only a few examples of the down-to-earth help and service he can depend upon. Call in Scovill NOW . . . especially if you want to get ideas and help in selection of the BEST metal for an important new product.

SCOVILL MANUFACTURING COMPANY
Mill Products Division, 99 Mill St., Waterbury 20, Conn., Phone Plaza 4-1171

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MADE IN USA

. . . and made better to bring out the **BEST** *in your products*

4SC60

When you think of
FLEXIBILITY

Lucas provides

Lever control.

Pendant control

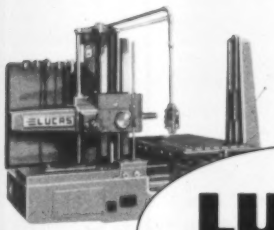
Tape control

and a variety of combinations of the three for flexibility of control suited to the type of work required.

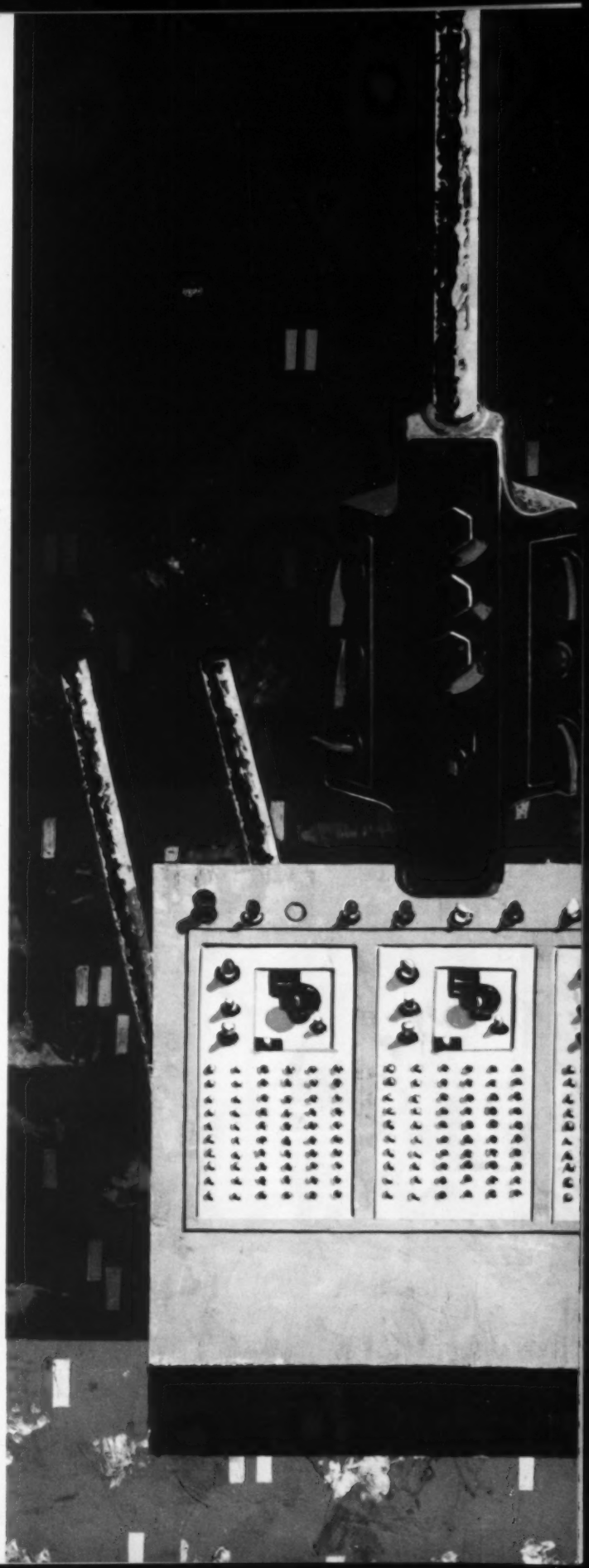
For example . . . The Multiple Control Pendant selects speeds, feeds, unit travels, rapid traverse of head, table, saddle and spindle, plus the rotation of the spindle forward and reverse, jog and stop. Speeds and feeds can be pre-selected while the machine is in operation.

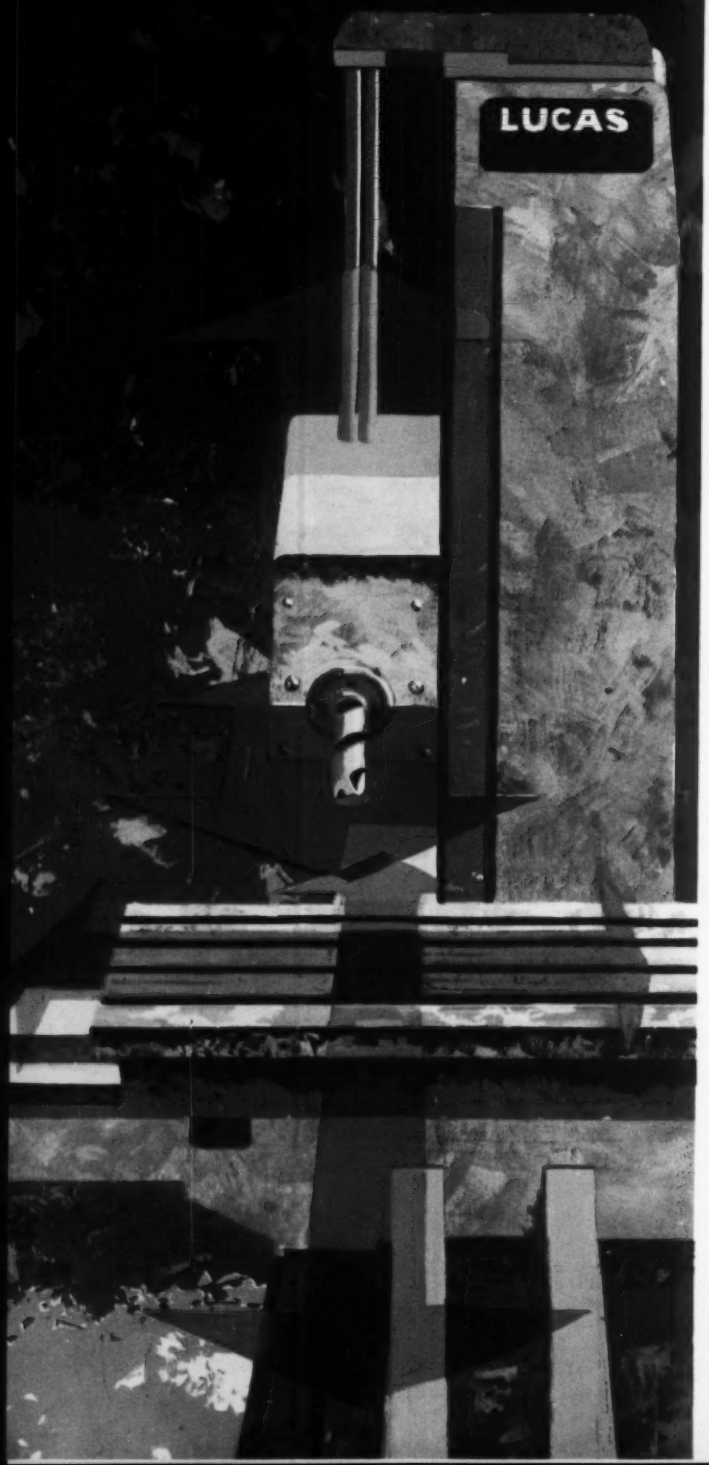
Practical applications of these controls are spelled out in a new catalog. Write Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of flexibility . . .

think of . . .



LUCAS
PRECISION





When you think of VERSATILITY

Lucas feeds the saddle ⇐

Lucas feeds the spindle ⇒

Feeds both in combination ⇒ ⇐

when necessary.

Combine these motions with

Vertical spindle head travel ⇕

and horizontal table travel ⇔

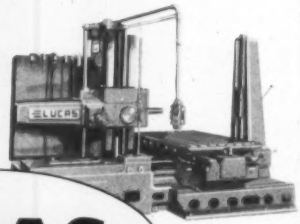
and a rotary table ↻

if you need it.

The result . . . no machine tool can offer a greater combination of usable motions for boring, drilling, milling and related work.

Over twenty models and a dozen major attachments. Write Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio. When you think of versatility . . .

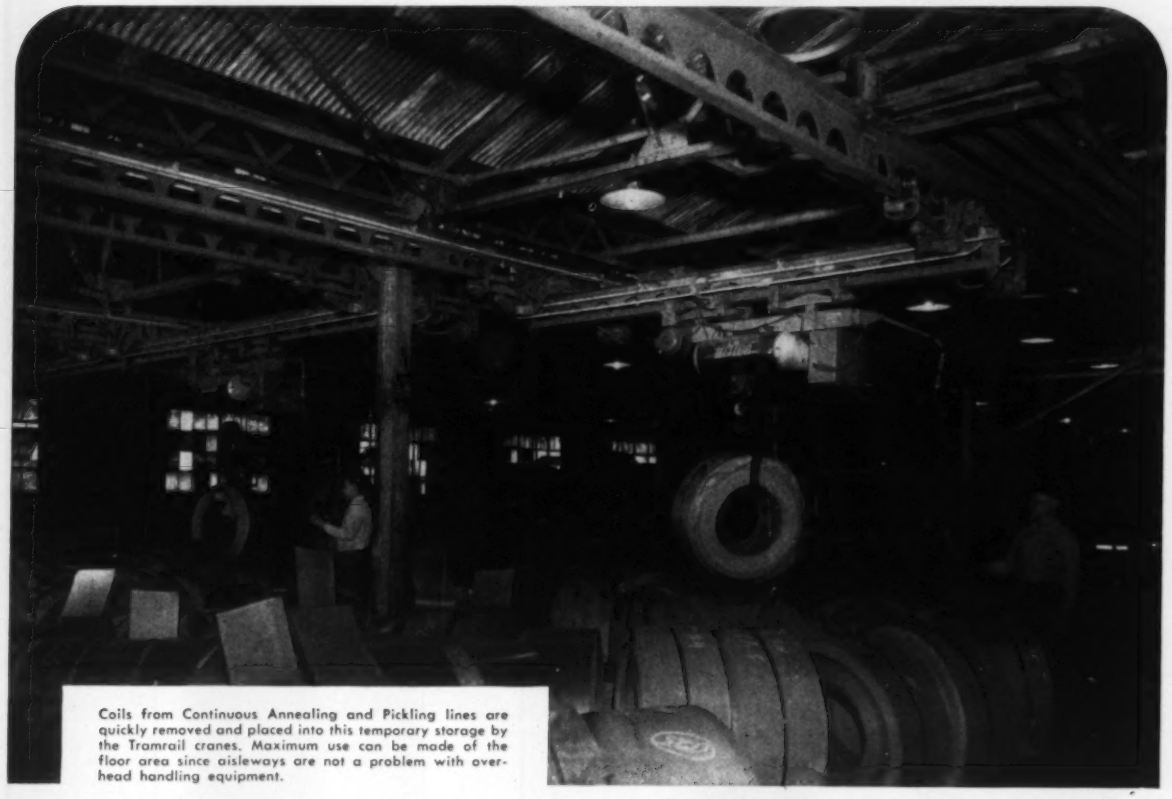
think of . . .



LUCAS
PRECISION

Tramrail Cranes BOOST Strip Production

Speed Handling—Cut "Down Time"—Aid Safety



Coils from Continuous Annealing and Pickling lines are quickly removed and placed into this temporary storage by the Tramrail cranes. Maximum use can be made of the floor area since aisleways are not a problem with overhead handling equipment.

AS a leading producer of high quality alloy strip steels, mostly of light gauge, the Superior Steel Corp., Carnegie, Pa. has secured definite production advantages and greatly improved overall plant efficiency through abundant use of Cleveland Tramrail cranes.

As the work is primarily that of rolling, annealing, pickling and handling, to obtain maximum production from their equipment, it is necessary to keep it in operation as many minutes out of the day as possible. This means that there be no delays in handling the coils of strip to and from the mills. It also means that the mill rolls must be changed in the least possible time. The Tramrail cranes have proven of great success in fulfilling these requirements and reducing "down time" to a minimum.

They have also proven to be a great aid to the workers' welfare. Being fully motorized, they have practically eliminated all manual lifting and moving. As a result, worker fatigue has been reduced and safety improved.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7883 East 284th St., Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

NATCO
B
A

From one pushbutton station, the line operates as a single unit, but each machining element has its own controls for independent operation.

A "medium" production transfer line like this can be built by adding as little as 12½ per cent to the cost of the individual machines.

New Convertible Transfer Line Trims Costs of "Medium" Production

By linking four standard Natco multiple-spindle drilling machines with transfer devices, Caterpillar Tractor Co., Peoria, Ill., has substantially reduced the cost of drilling and reaming diesel cylinder blocks. The transfer line incorporates three standard Natco 2-way machines and one vertical C4B.

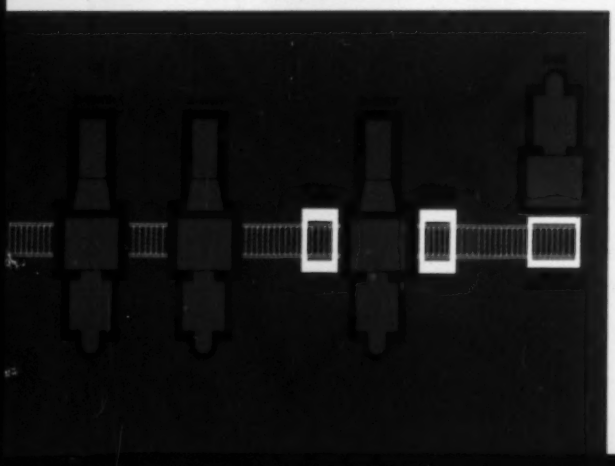
Each machining unit is self-contained with its own hydraulic and electrical system. Machine units can be interchanged or removed from the line for independent operation. Transfer links are standard Natco types.

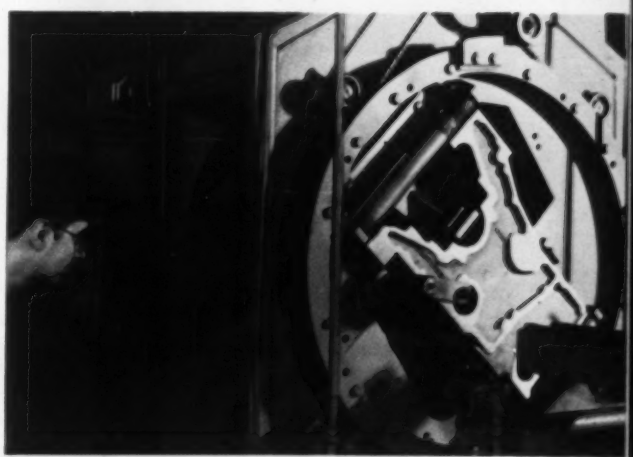
Take advantage of this new approach to "medium" volume production by calling your Natco representative. Write for bulletin No. 100.

NATCO

The National Automatic Tool Company, Inc., Richmond, Indiana

Rollover, shuttlebar, and walking beam transfer devices link the various machining units of this unusual line.





Rollover device repositions cylinder block. Other Natco transfer devices resolve the loading differences between machining units, providing both in-line and cross-line motion.

Extruded section reduces material required 65% on this flash butt-welded missile part

By leaving 2/3 of the titanium required at the mill, dramatic savings were effected on this ram jet engine part used in the Bomarc.

Amweld quoted the job, suggesting a special extruded section shown here, and saved 19.8 lbs. of expensive titanium per ring. The flash butt-welded rings from extruded sections offered additional savings in machining time, since only a small amount of metal had to be removed.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

STEEL
The Metalworking Weekly

Metalworking Week®

August 29, 1960

STEEL to Report on Foreign Competition's Impact

Next week, STEEL will present what the editors believe to be the most comprehensive report on foreign competition's impact on the U. S. economy that has ever been published. The special issue will point up the severity of the problem, detail the causes, summarize the buildup in foreign production, and suggest numerous approaches that you can use in your strategy for survival—and competitive improvement—in the new world market. Watch for the Sept. 5 issue of STEEL.

Construction—Good, Fair, or Poor for You?

The construction industry is having a good, fair, or poor year, depending on the segments of the industry that mean bread and butter to you. In a summary of the first half, F. W. Dodge Corp. reports: Commercial building contracts, at $1.7 billion, were about equal to the record total in 1959's first half. Residential building, at $7.6 billion, was down 14 per cent. Manufacturing building, at $971 million, was up 10 per cent. Educational building, up 12 per cent to nearly $1.5 billion, showed the largest dollar gain. Hospital construction dropped 24 per cent to $366 million. Public building contracts totaled $331 million, down 2 per cent. Religious building eased 2 per cent to $392 million. Recreational building reached a record $337 million. Public works contracts rose 2 per cent to $3.16 billion, with highways, the largest segment, up 4 per cent. Utility contracts dropped 13 per cent to $1 billion. The boomingest segment of the industry during the first half? Jails and penitentiaries.

Pipeline Construction Doubles

The natural gas industry is laying new pipelines and building compressor stations at a rate double that of a year ago. Projects underway or just completed involve 11,547 miles of gas pipeline and $1.2 billion worth of compressor facilities, reports Gas Appliance Manufacturers Association.

Housing Starts Drop in July

Private, nonfarm housing starts in July declined to a seasonally adjusted 1.12 million (vs. 1.28 million in June and 1.32 million in May), the Commerce Department reports. The July, 1960, figure was 25 per cent below the year earlier mark.

Canada's Business Picture Takes on Slightly Rosy Hue

The latest survey by the Canadian Association of Purchasing Agents shows 31 per cent registering new order increases and only 24 per cent experiencing

a drop in bookings. Production in July about equaled that of June; employment rose slightly; prices remained steady; inventories continued to decline.

U. S. Ingenuity Mechanizes the Dog Sled

Two loops of roller chain, some metal slats, and a gasoline engine may replace the husky sled dog. Polaris Industries Inc., Roseau, Minn., has designed a sled propelled by metal slats, which are driven by two loops of Link-Belt roller chain connected to a Kohler engine. The ingenious setup pulls the sled over ice and snow at about twice the speed of a dog team.

U. S. to Help Ghana Get into Aluminum Business

The State Department says the U. S. is ready to put up $30 million for Ghana's proposed aluminum project on the Volta River. The chief condition is that the African country line up the rest of the needed financing. Observers expect Kaiser Aluminum & Chemical Corp. to be one of the money sources.

Our Balance of Payments Problem Remains Serious

During the second quarter of this year, the U. S. registered a deficit in its balance of payments equal to a $3 billion annual rate, the Commerce Department reports. An improvement in our merchandise trade balance was offset by an outflow of capital, largely in foreign aid.

How State Unemployment Benefits Compare

The Conference Board reports these figures for unemployment benefits in leading metalworking states:

	Weekly payment	Maximum weeks		Weekly payment	Maximum weeks
California	$55	26	Pennsylvania	$40	30
New York	50	26	Indiana	36	26
Wisconsin	49	34	Rhode Island	36	26
Connecticut	45	26	New Jersey	35	26
Washington	42	30	Illinois	32	26
Ohio	42	26	Michigan	30	26
Massachusetts	40	26	Texas	28	24

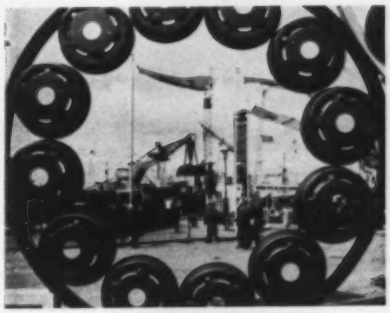
Tool Steel Industry Cites Foreign Competitive Pinch

While tonnage steel imports are declining, imports of two major classes of alloyed steel bars are gaining momentum—threatening to export U. S. jobs in the tool steel industry, James P. Gill, chairman, Vanadium Alloys Steel Co., warned the Tariff Commission last week. Imports, he pointed out, hit 4.6 million lb during the first four months alone. In 1959, imports totaled 6.5

million lb, more than twice the 1958 figure (3 million lb). Major factor: Low wage rates abroad.

Industry Goes to the Fair—Overseas

This scene from the Hanover (Germany) Fair will be repeated many times in the next 18 months as more U. S. firms participate in foreign trade fairs. The Alexander Hamilton Institute estimates that 750 U. S. firms will join nine trade fairs this fall. Fairs already scheduled for the first half of '61: Colombo (Ceylon), Cairo, Tokyo, Turin (Italy), and Poznan (Poland).



Will U. S. Lose Another Industry?

Robinson F. Barker, vice president, Pittsburgh Plate Glass Co., says the peril point for sheet glass has been reached, that the U. S. glass industry is losing its markets to foreign competition. He told the Tariff Commission that PPG's sheet glass factory workforce has declined nearly 25 per cent since August, 1959. He reports that U. S. imports of sheet glass have risen from 31.7 million lb in 1950 to 502.6 million lb last year—an increase of 1485 per cent. During the same period, U. S. sheet glass exports declined from 13.4 million lb to only 4.3 million. Last year, imports equaled 31 per cent of domestic production.

Population in 2050: Standing Room Only?

Present population growth rates would boost U. S. population to about 1 billion by 2050, says the Population Reference Bureau. U. S. population was estimated at 179,865,000 on July 1, 1960, by the Census Bureau. During the 1950s, the U. S. citizenry increased by around 1.7 per cent per year (vs. 1.4 per cent in the 1940s and 0.7 per cent in the 1930s). PRB says the population can reach 215 million by 1970, 260 million by 1980 and 380 million by the end of the century.

First Half Sales High for Radio and TV Makers

During the first six months of this year, 2.96 million TV sets were produced (vs. 2.78 million in the like 1959 period), and 8.5 million radios were turned out (vs. 7.1 million), Electronic Industries Association reports.

Good Manager Looks to Subordinates, not the Boss

Top executives should be more interested in their subordinates than their bosses, Michigan State University's John B. Coyle told a seminar on per-

sonnel development last week. To command respect, top staffers should have strong, well thought out, convictions—in ethics and economics—and be willing to sacrifice their jobs for their principles, Mr. Coyle asserts. He says the "politically minded, production centered, foreman is a second rate supervisor."

Researcher Proposes One Weather Forecaster for the World

R. P. Haviland of General Electric's Missile & Space Vehicle Dept., has proposed a single weather forecasting center for the world. He says such a center, preferably located in the polar regions, has been made practical by recent satellite advances. Data could be transmitted by radio, satellite relay, or television. Complete storm structures could be photographed.

Instant Electricity Is Closer

An experimental nuclear core designed for use in a compact reactor which would generate electricity directly (via thermoelectric elements with no moving parts) has been tested successfully, the Atomic Energy Commission reports. Designed and built by Atomics International Div. of North American Aviation Inc., the system is expected to generate 300 watts of electricity. Thermocouples will surround the reactor core.

Straws in the Wind

By 1970, the U. S. consumer market will be nearly $140 billion bigger than the current one, with annual outlays for autos and appliances about double the 1955 record, predicts McCann-Erickson Inc. . . . July new orders for metal cutting machine tools, at $32.8 million, fell to the lowest point since January, 1959, and new orders for metal forming types, at $9.3 million, dropped to the lowest level since November, 1958, a report from the National Machine Tool Builders' Association indicates . . . Delco-Remy Div., General Motors Corp., Anderson, Ind., is sending 700 supervisory personnel to The Machine Tool Exposition—1960 in Chicago . . . Sharon Steel Corp. will consolidate all administrative functions at its general offices in Sharon, Pa., effective Sept. 1 . . . Brush Beryllium Co. has created four divisions to "take fullest advantage of broadening opportunities" . . . Wonder Building Corp. of America, Chicago, has unveiled fallout shelters that will sell for as little as $295.

Metalworking Pulse

The Business Trend: Shutdowns for auto model changeovers caused STEEL's industrial production index to drop to 144 for the week ended Aug. 20, 3 points under the previous week. Carloadings, electrical output, and steel gained slightly. **Autos:** By the end of this week, all U. S. carmakers except General Motors should be producing '61s. Most GM lines are scheduled to start up Sept. 6. **Steel:** Production has held at 1.5 million tons for six consecutive weeks.

- **INDUSTRIAL PRODUCTION**
  - Week ended Aug. 20 . . . **144†**
  - Year ago **112**

  Details on Page 121
- **PASSENGER CAR PRODUCTION**
  - Week ended Aug. 27 . **35,000***
  - Year ago **18,335**

  Details on Page 118
- **INGOT PRODUCTION RATE**
  - Week ended Aug. 28 . **54.5%†**
  - Week ago **54.7%**

  Details on Page 244

†Preliminary. *Estimated.

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From ten-yard pipe to ten thousand valves Hevi-Duty matches the furnace to your requirements

Whether you process 30-ft castings or thousands of small parts . . . whether you use fuel-fired or electric heat . . . automatic or batch handling, the correct combination can be supplied by Hevi-Duty.

Hevi-Duty offers a wide selection of furnaces, each one carefully engineered to hold close tolerances . . . to turn out uniformly high-quality products day after day, year after year.

If you have a heat-processing problem, why not call in a Hevi-Duty sales engineer? We are almost certain he can help you, for he is much more than an order taker. He is a consultant— qualified to recommend entire heat-processing systems and backed by a company that can quickly adapt the equipment to fit your needs exactly.

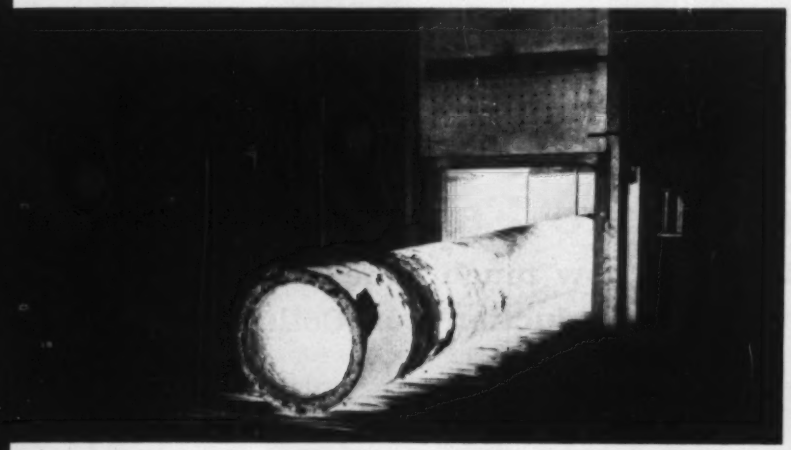
HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

B P C

A Division of Basic Products Corporation

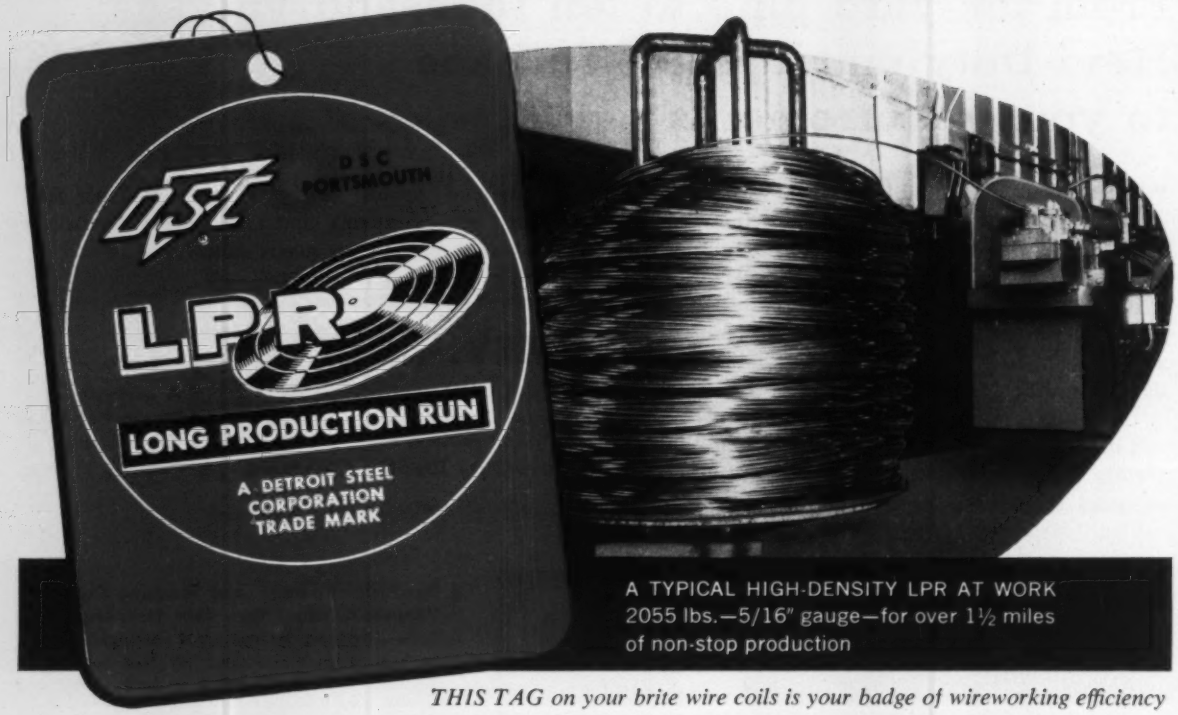
Hevi-Duty Electric Company, Milwaukee 1, Wis.



◀ Sandusky Foundry and Machine Company, Sandusky, Ohio, uses this Hevi-Duty car-bottom furnace to heat-treat castings up to 54 inches in diameter and 30 feet in length. Heating elements located in both ends, and in the car bottom, plus three fans, produce a degree of temperature uniformity generally expected only in smaller units. **For complete information, write for Bulletin 644R.**

▲ Pacific Steel Casting Company, San Francisco, California, is pleased with the operation of this Hevi-Duty Clean-Line Furnace. It heats, holds at the correct temperature for the prescribed period, transfers each load to the cooling chamber, and discharges baskets of castings automatically. A retractor on the unload table enables the Clean-Line Furnace to process four baskets without manual handling or supervision. Heat-treated castings come out ready for shipping without further attention. **For complete information on this, write for Bulletin D-100A.**

▲ Eaton Manufacturing Company's Valve Division really proves the ability of Hevi-Duty pit furnaces to maintain uniformity. They process dense 2,000-lb charges of valves — 10,000 to a load — all free from distortion, all uniformly hard . . . no rejects. An efficient fan and baffle system provides an even rate of heating throughout the dense load and contributes to over-all uniformity. **For complete information, send for Bulletin 646A.**



A TYPICAL HIGH-DENSITY LPR AT WORK
2055 lbs.—5/16" gauge—for over 1½ miles of non-stop production

THIS TAG on your brite wire coils is your badge of wireworking efficiency

Are You a Brite Wire Fabricator?

Your first LPR will prove how much time and money you save with Long Production Run Coils

FACTS OF WIREWORKING

The smaller your bundles, the more of them you use in every job run. The oftener you change coils, let alone the coincidental set-up adjustments you make, the more machine time you lose and the more coil-remnant scrap you generate—

In a nut shell:

LPR's MINIMIZE DOWNTIME AND COIL REMNANT SCRAP . . . THE NO. 1 PROFIT PIRATES IN WIREWORKING

At the right, you'll read reports of the experiences of brite wire fabricators who switched to Long Production Run LPR's from conventional bundles that weighed from 150 to 400 pounds. (We'll gladly document.)

USER EXPERIENCES

- Downtime frequency due to coil changes and set-up adjustments reduced as much as 95%
- Unloading time alone cut as much as 82%
- Productivity increased from 20% to 33⅓%
- Scrap loss slashed in direct ratio to coil changes avoided
- Man-hour costs trimmed 20% and more
- High density, self-supporting coils reduced storage space by 20% to 50%
- Inventory management greatly improved
- Returnable-carrier problem and small coil racks eliminated.

YET LPR's COST NO MORE THAN COMPARABLE BRITE WIRE IN SMALL COILS

Care for further proof . . . or a demonstration? For quick action please call your nearest DSC Customer "Rep" Office or write: Detroit Steel Corporation, Box 7508, Detroit 9, Mich.

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

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Performance Proved DST® Steel

DETROIT STEEL

Flat Rolled and Wire Products

New Era in Machine Tools

Too many management men are still clinging to the archaic notion that machine tools and other production equipment should be replaced only after they wear out.

But rising wage and material costs, more intensive competition here and abroad, and the squeeze on profits are forcing alert managers to take a new look at production costs.

More and more management people are coming around to the view that equipment becomes obsolete and should be replaced as soon as something better comes along.

That "something better" will find abundant expression at The Machine Tool Exposition—1960 in Chicago, Sept. 6-16. More than 1000 new machines will be on display.

Many of the machines will typify the changing concept of automation.

Automation is ordinarily thought of in terms of an automotive transfer line turning out thousands of parts. The concept is being applied at an accelerated rate to single machine tools and presses turning out parts in small lots.

For instance, a large, numerically controlled boring, drilling, and milling machine will automatically change any one of 84 tools, ranging from ¼ in. drills to 14 in. milling cutters, and do operations in any sequence.

A lathe, equipped with similar controls, will do all roughing and finishing cuts, including arcs and slopes.

Those and other machines, including punch presses and drill presses, will perform at the command of punched tapes prepared by simply typing the data on an electric typewriter.

Such machines will permit U. S. industry to compete, here and abroad, with foreign plants employing low paid labor.

In this new era of automated machine tools, you will need to know how much of your equipment is no longer paying its way.

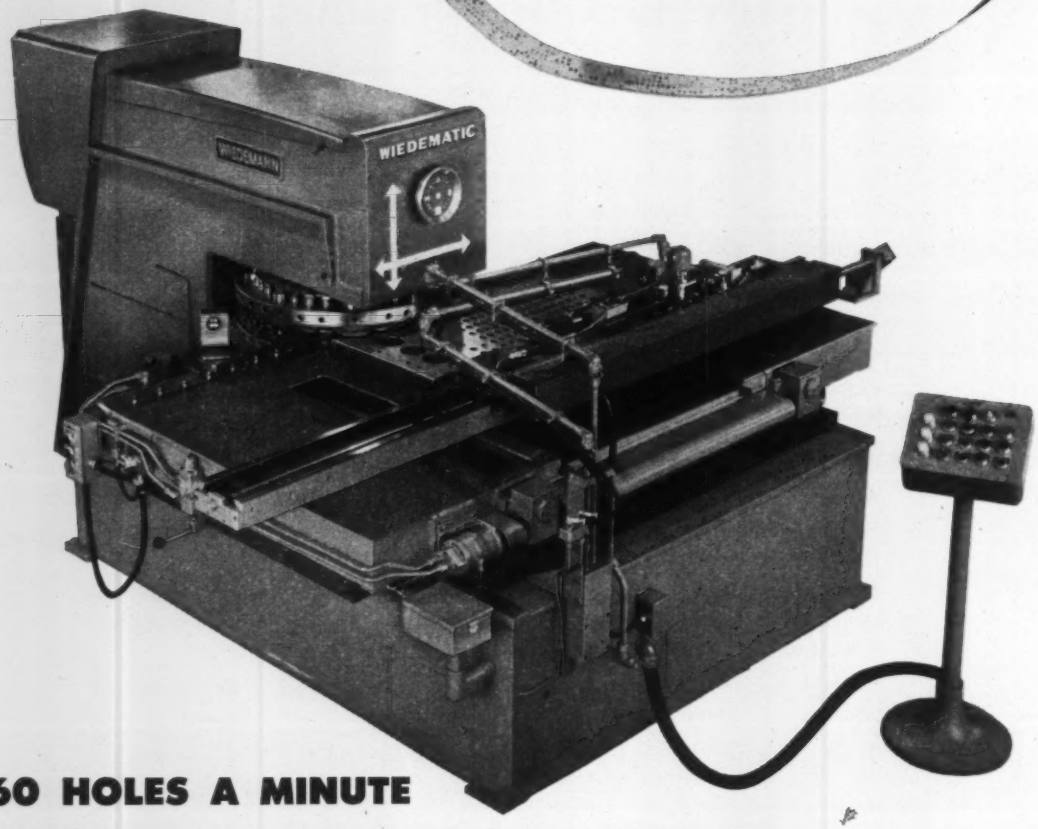
The Machine Tool Exposition—1960 provides an excellent opportunity to find out!

Irwin H. Such

EDITOR-IN-CHIEF

SEE THE BIG ADVANCES

WIEDEMATIC
TURRET PUNCH PRESS
with Numerical Positioning Control



60 HOLES A MINUTE
with Automatic Work Positioning and Tool Selection

SEE the Wiedematic position and punch holes of many sizes and shapes automatically in actual production runs of sheet metal and plate parts.

SEE how all press operations are controlled with amazing speed and accuracy by an easily prepared punched tape.

SEE how the Wiedematic Method reduces production costs 60% to 90% and provides the key to major savings in every other phase of your operations from design to final assembly.

Be sure to see the Wiedematic in operation — Booth 1249 at the Machine Tool Exposition.

WIEDEMANN

WIEDEMANN MACHINE COMPANY
DEPT. S-8 • GULPH ROAD • KING OF PRUSSIA, PA.

International Amphitheatre
Chicago, Ill. • September 6-16

REGISTER HERE,

IN FLEXIBLE FABRICATION

WIEDEMANN TEMPLAMATION

Making Full Use of Low Cost Templates For Fast, Accurate Piercing

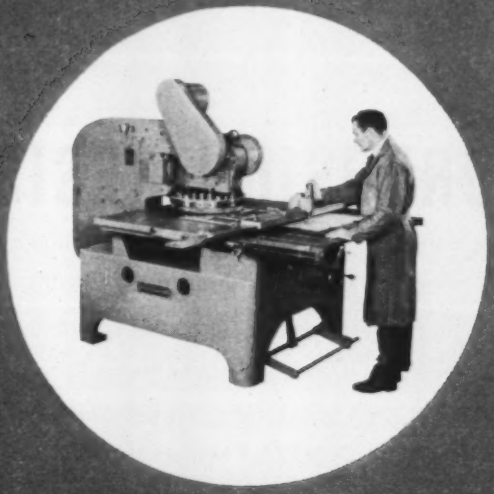
SEE how Wiedemann Templamation employs templates to ensure accuracy and reduce piercing costs.

SEE how high accuracy templates are made rapidly on the COORDINATOR . . . inspected without guesswork on the direct reading INSPECTOR . . . then used for positive work positioning on a WIEDEMANN Turret Punch Press equipped with a high speed follower gauge.

SEE how Wiedemann Templamation gives you many of the advantages of automation with manually operated machines.

1. TEMPLATE IS MADE ON THE WIEDEMANN COORDINATOR

2. TEMPLATE IS INSPECTED ON THE WIEDEMANN INSPECTOR

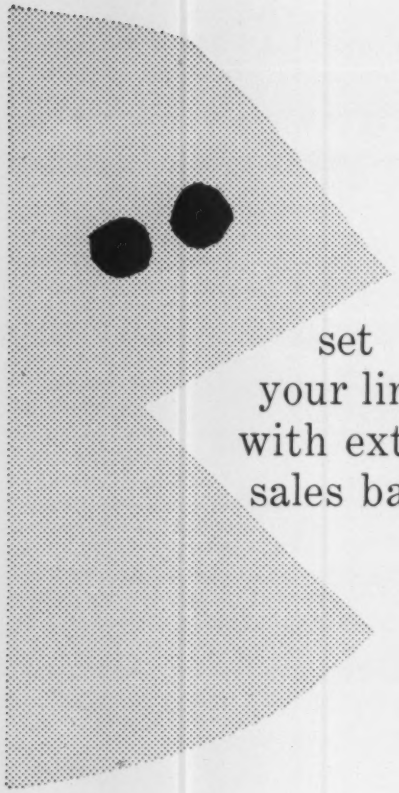


3. TEMPLATE IS USED FOR HIGH SPEED HOLE POSITIONING ON THE WIEDEMANN RA-41P TURRET PUNCH PRESS

Other Wiedemann Turret Punch Presses will also be in operation.

THEN HEAD FOR THE FAR CORNER—BOOTH 1249

WIEDEMANN



• specify • specify

set your line with extra sales bait

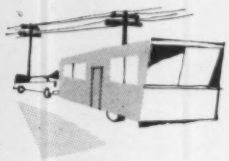
TI-CO® NON-FLAKING GALVANIZED SHEETS

for CORROSION RESISTANCE

Anywhere there's a corrosion problem . . . there's a place for INLAND TI-CO! More and more, makers of famous-name appliances, producers of farm equipment, manufacturers of thousands of products which must withstand moisture-laden atmospheres, in or out-of-doors, are recognizing non-flaking TI-CO as the standard of excellence in galvanized sheets. ■ TI-CO galvanized sheets keep your product components functioning longer and add years to the appearance of the finished product . . . giving consumers greater value and adding "sales bait" to your product line.

INLAND STEEL COMPANY 30 West Monroe Street • Chicago 3, Illinois Sales Offices: *Chicago • Davenport • Detroit Houston • Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul*

INLAND



TI-CO protects families, too, in modern house trailers. Thousands of these compact, mobile homes have roofs made of this non-flaking galvanized sheet.

Years of corrosion-resisting service are added to washers, dryers, refrigerators and other appliances whose parts are made of non-flaking TI-CO.

Poultry feeders and other farm equipment subjected to weather and abusive chemicals last longer when made of non-flaking TI-CO.

What the Reds Are Buying from Us

YOUR PRODUCT is probably among those the Soviets are buying, negotiating to buy, or interested in buying from the U. S.

The list at right represents only a sample of the products for which export licenses to ship to the Soviets were granted in the second quarter. Each license involves more than $48,000 worth of metal products. The largest sum is $5.3 million.

The list of licenses valued under $48,000 is much longer and includes a wider range of products. Here are examples:

- **To Czechoslovakia**—Air conditioners, industrial furnaces, printing equipment, accounting and bookkeeping machines, movie cameras and parts, shoe machinery and parts.

- **To Hungary**—Excavator parts, microphones, passenger cars, punched tape equipment, magnetometers, calculating machines.

- **To Poland**—Seismograph cables and reels, tensile testing equipment, aircraft engines, station wagons and pickup trucks, cobalt metal, cold rolled stainless sheets.

- **To Russia**—Laboratory centrifuges and parts, ball and roller bearings, air compressors, centrifugal pumps, hoists and parts, oil fired steam boilers.

In its quarterly report on exports to Congress, the Commerce Department stated that applications to export $60 million worth of products to the Communists were approved in the first half. The gain: $4 million above the figure for all of 1959 (STEEL, Aug 22, p. 39).

The stepup in export licenses granted and the broader range of products do not reflect any relaxation of national security considerations. Technical progress in the Soviet bloc is the key element behind the advance.

Products Licensed for Export to Soviet Bloc in 2nd Quarter, 1960

Product	Country	Value in dollars
Thread grinder equipment	Czechoslovakia	$59,500
Carbon steel skelp (coils)	"	660,000
Magnesium ingots	"	246,915
Cold rolled carbon sheets	East Germany	4,819,998
Hot rolled carbon sheets	"	74,033
Steel strip	"	140,478
Tin mill black plate	"	90,500
Tin mill black plate	Hungary	48,948
Tin plate	"	79,599
Accounting machines	"	48,613
Auto parts, accessories	Poland	103,982
Tin mill black plate	"	281,984
Cold rolled carbon steel	Rumania	100,960
Compressors	USSR	2,380,000
Conveyors & parts	"	122,315
Icemaking machinery	"	94,217
Plastic extruders, parts & dies	"	60,387
Prefab metal buildings	"	71,351
Processing vessels	"	171,255
Ram & fork lift trucks	"	629,460
Automatic machines for making auto cylinder blocks	"	5,300,000
Cold rolled carbon steel	"	678,010

Source: Commerce Department.

- **Official Policy**—Commerce Department officials say three guideposts are important in the decision on whether to grant an export license:

1. Can the Russians or their satellites do the job themselves?

2. Would rejection of the export license appreciably delay any strategic project they're working on?

3. Can they obtain the products or equipment elsewhere outside the Soviet bloc?

So, as the technological and productive capabilities of the Reds improve, the number of products O.K.'d for export to them will probably increase. Here are three cate-

gories in the Commerce Department's export control procedure to watch when you're considering trade with the Soviet bloc countries.

1. General Licenses Special List (GLSA), which includes nonstrategic items that may be exported anywhere except Red China, North Korea, and North Viet Nam under a general export license.

2. The Positive List, described as our "security export control," which requires an export license to ship to any country except Canada.

3. General List, which includes items not specifically covered in either the Positive or GLSA categories. Export licenses are required to ship to the Communist nations but not the rest of the world.

• **Powder Puff List**—In its quarterly report, Commerce officials noted that "some 250 commodity categories have been added to the GLSA list" of nonstrategic goods which may be shipped to the Soviet bloc under a general export license. It is known as the powder puff list, and the Soviets have said they're generally not interested in the items.

Machine tools are in big demand. If you're planning to attend The Machine Tool Exposition—1960 in Chicago next week, you probably will see some Communist representatives taking a close look at the new machines.

• **What They Want** — STEEL checked to see how interested domestic equipment builders are in doing business with the Soviets and in what areas most of the inquiries are being made.

The Reds are especially interested in numerical control, states one Midwest equipment builder. "Russia is far behind us in tape control for machines, at least from a production application standpoint. But government won't permit the export of feedback systems."

N. A. Leyds, vice president-general manager, Bryant Chucking Grinder Co., says his firm has an order for internal grinders. It's substantially in excess of $750,000.

Detroit Broach Co. officials say: "We're quite interested in doing business with the Soviet bloc. We have an inquiry we're checking on now; we have some quotes out, but no orders as yet."

A Midwest press builder is currently quoting on a standard piece of forming equipment. "We've heard rumors that the Soviets are interested in other types of presses, but we've only received the one inquiry," the press builder related.

• **Some Reluctance**—Several equipment builders admitted keen interest in Red bloc sales but declined to be quoted "until more firms commit themselves, and we can see what reaction develops."

U. S. Steel made this statement recently: "U. S. Steel has not shipped and is not now willing to ship products to Russia or China. U. S. Steel is willing to ship to satellite countries under conditions established by and with explicit approval by the Departments of State and Commerce. Some minor shipments have been made under these conditions."

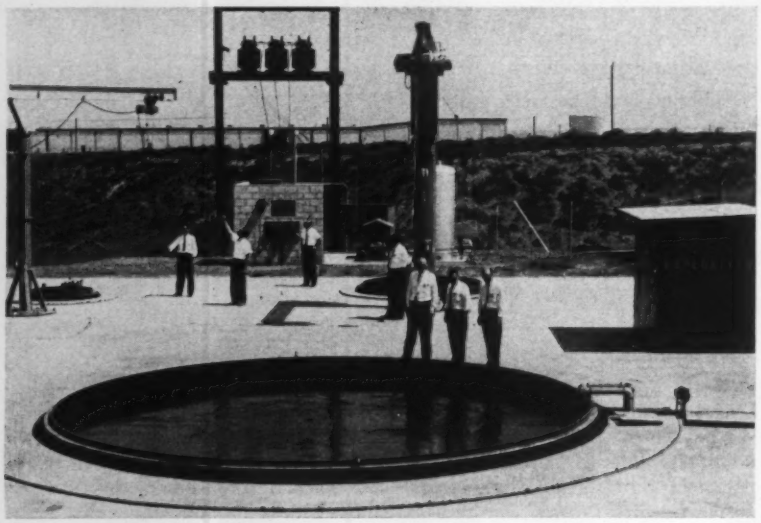
A startling number of executives expressed surprise at the quantity and variety of products being traded with the Soviets. Many, along with Tino Perutz, president, OMNI Products Corp., feel it's time a new look is given to the trade situation.

• **What Others Are Doing** — Mr. Perutz, speaking at the American Marketing Association conference in June, pointed out that our competitors have set up trade practices already.

"Japan," he said, "has a three-year bilateral agreement with the Soviet union which will account for about $200 million worth of trade in each direction. Canada recently signed a three-year bilateral trade pact under which the Soviets will spend $2 in Canada for every Canadian dollar spent in Moscow. England is committed to a five-year trade pact."

Mr. Perutz also pointed out some of the problems, such as refusal of the Soviets to recognize patents. He suggests that a patent and copyright agreement subscribed to by the Soviet government would remove one barrier to better trade relations.

He suggested that there might be some merit in establishing a voluntary trade association of those firms engaged in trade with the Soviet bloc. He feels such an interchange of ideas and experiences might help businessmen "determine uniform conditions for payment terms, for arbitration clauses, for guarantees regarding machinery and equipment, and for possible implementation of such guarantees by the retention of monies."



EXPLOSIVE FORMING FACTORY near San Diego, Calif., will turn out engine pods, stainless tailpipes for jets, and a large quantity of aircraft and missile radar antennas on a production basis. Ryan Aeronautical Co. built the facility after gaining considerable experience in explosive forming with a wide variety of aircraft and missile parts. Tank in the foreground will handle a 20 ft die for hemispherical missile bulkheads, says Floyd Cox, manufacturing preplanning manager

Plate, Structural Users May Feel Rail Strike

SETTLEMENT of the strike against Union Railroad Co. by the United Steelworkers was said to be "hours to several days, or longer" from agreement as STEEL went to press last week.

The shutdown of the U. S. Steel Corp. subsidiary had forced the steelmaker to bank Pittsburgh area blast furnaces because hot metal ladles are moved over Union Railroad tracks. Operations at the Edgar Thomson Works, Clairton, Duquesne, and Homestead were substantially curtailed too.

The major issue revolved on the union's demands for wage and benefit boosts similar to those granted USW steel mill employees. The company contends that the national railroad settlement should be followed. Nearly all past agreements have been settled on the railroad pattern.

STEEL learned that the Union Railroad had agreed to give the union insurance and pension benefits closely following the steel industry pattern, and the union, in exchange, had consented to forget its demands for Supplemental Unemployment Benefits, shift differentials, and Sunday premiums.

The stumbling block seems to be the size of the hourly wage increase. Management claims the union wants a substantial boost that goes beyond the rail pattern. Union contacts reported that the two sides were about a nickel apart.

Leverett Edwards, member of the National Mediation Board, was called to Pittsburgh to speed up negotiations.

• If the strike is prolonged, some of U. S. Steel's customers in the Pittsburgh area will look to other suppliers if shortages crop up.

Hardest hit will be the plate and structural customers. Because they are ordering hand to mouth and depending on three weeks' delivery, they will have to turn to other suppliers when U. S. Steel stops shipping. Bethlehem Steel Co. would profit the most.

As the strike continues, deliveries of heat treated alloy plates (now available in four to six weeks) will probably be extended to eight or ten weeks. U. S. Steel has heat treating facilities for plates at the Homestead Works that aren't duplicated elsewhere in the corporation.

Sheets needed by Pittsburgh area customers can be obtained from Jones & Laughlin Steel Corp., Pittsburgh Steel Co., Weirton Steel Co., Wheeling Steel Co., or Republic Steel Corp.

Wire and tubular products aren't involved because U. S. Steel's National Tube Div., McKeesport, Pa., and American Steel & Wire Div., Donora, Pa., do not depend on the Union Railroad.

Though almost all the products made in Pittsburgh are available from other plants (Fairless, Gary, or South Chicago), the customers are certain to balk at paying the extra freight charges.

• Despite the shutdown, some steel was being produced in the Pittsburgh area.

Limited quantities of blooms, billets, and slabs were moving to the finishing line. Rolling operations will continue at the Irvin Works, Dravosburg, Pa., until semifinished steel supplies are exhausted.

Steelworkers have not been restricted from reporting to their jobs. So U. S. Steel can continue to process metal already inside the mills, but it can't make new steel.

Finished steel that normally leaves the plants by Union Railroad is going out by truck.

Steel Firm Will Hike Stainless Capacity 50%

Armco Steel Corp., Middletown, Ohio, will boost the stainless bar shipping capacity of its Baltimore Works 50 per cent in a $1.8 million expansion program, announces C. G. Davies, vice president and general manager, Armco Div.

The facility will be able to ship 3000 tons of stainless bars a month and provide a reserve shipping capacity for peak demands.

ULTRASONIC TRANSDUCERS on the bottom of this vacuum arc casting furnace change grain structure from long columnar fine grain type; reduce segregation; make some alloys like columbium workable; and generally improve properties of materials refined in the device. Installed at the Blairsville, Pa., plant of Westinghouse Electric Corp., it is said to be the latest wrinkle in vacuum arc casting. A similar setup has just been developed for cold mold arc systems by Battelle Memorial Institute, Columbus, Ohio.

Maintenance: Ripe for Cost Cutting

TAKE THE LABOR costs of your maintenance employees; add the cost of your maintenance supplies. Would you be interested in saving 30 per cent of the total?

That's a conservative estimate of what you can realize if you exercise the same control over maintenance that you do in production.

• Studies by management consultants indicate that few maintenance departments operate at more than 50 per cent efficiency.

One consulting firm surveyed eight companies that established work standards for its maintenance workers and put them on incentives. Worker productivity increased 25 to 93 per cent. Net yearly savings (after deducting administrative costs) ranged from $6000 in a firm with 35 maintenance employees to nearly $7 million in one with 2800 maintenance workers.

Costs can be taken out of the maintenance function many ways (see checklist). The more you are willing to spend on analysis and supervision of maintenance, the more you can save. The cost of administration will determine your practical maximum.

• One of the sharpest management tools is work measurement.

Like production work, maintenance can be broken down into basic operations that can be measured. Time-study techniques can be used to set standards which will cover more than 80 per cent of the general work done.

"In the establishment of work standards, management usually learns through analysis of accumulated data that 20 per cent of the working time of a maintenance employee is lost in hunting for or going after materials and tools," explains E. A. Cyrol, management consultant, Chicago.

"A simple improvement in methods, such as adding a hand cart or small motorized truck to carry the materials and tools normally required for on-the-spot repairs, can increase a man's output up to 20 per cent.

"Increases in worker productivity accomplished through work measurement come . . . from working more effectively . . . not faster. Savings are in the form of eliminated nonproductive time," stresses Mr. Cyrol.

Work standards help bring into focus inadequacies in other phases of maintenance, advises Fred Mattka of Albert Ramond & Associates, another Chicago consulting firm.

"They are no cure-all," he cautions. "In applying them to a job to show what can be done, we find wasteful practices that stem from defects in organization, planning, scheduling, training, and other elements of maintenance."

Application of standard data furnishes the maintenance supervisor with a sound base for scheduling, crew-size control, make or buy decisions, and labor evaluation.

Standard data can be used for estimating total job credits for work which can be specified in advance. On repetitive work, such as janitorial services and oiling, routines can be established. When work cannot be prespecified, standard data can be used to check on the job as it progresses, or as soon as it is completed.

• With data developed through work measurement, jobs can be planned to utilize manhours effectively and minimize costs.

Those responsible for the plan-

11 Steps to Better Maintenance Control . . .

1. Organization

Lines of authority and responsibility in the maintenance department should be clearly defined. Its function in the plant operation should be clearly related to the other departments.

2. Job Skills

The whole maintenance organization should be appraised and evaluated for experience, aptitudes, and promotability. Training programs should be reviewed regularly.

3. Work Supplies and Tools

A workman must have the proper tools and supplies to do a good job. They should be easily accessible, so he won't spend more time getting them than he does on the job.

4. Base Rates and Salaries

An organized evaluation plan with written job descriptions helps to set base rates and salaries that are equitable with the wages paid other workers and supervisors.

5. Procedures

Good job order records are essential for costing manhours and materials. They provide a basis for comparisons to standards and budgets, or targets for cost control.

6. Planning

Knowing what work must be done and how it will be done permits estimates of costs and best manhour utilization. The make or buy decision should be made early in the planning stage.

7. Scheduling

Co-ordination of specified work with manhours, materials, and time is the function of scheduling. Effective scheduling minimizes costs and production downtime.

8. Work Measurement

Work standards provide a measure of method effectiveness and show up inadequacies in other areas of maintenance management.

9. Preventive Maintenance

Schedules for lubrication and inspection should specify where to lubricate, the type of lubricant, and frequency of the job. They assure proper work and fix responsibility.

10. Equipment and Facility Controls

Maintenance records against equipment permit identification and analysis of high costs and provide a basis for decisions to overhaul or replace machines.

11. Maintenance Cost Controls

Good cost breakdowns will permit targeting maintenance expenses in a realistic manner. Tied in with general accounting records, they provide an important tool for measuring over-all effectiveness of management controls.

ning function must determine what work should be done, where, how, and who should do it.

Plans should be written. They may be formal or informal, depending on the requirements for effective communication. Formal plans will contain step by step sequences of operations. The informal plans may not contain as much detail, but they will still reflect the best method of doing the work and data for costing.

Maintenance is the servant of production. Major jobs such as machine overhaul and scheduled part replacement are best planned for periods of machine idleness, as on weekends or vacation periods. A good preventive maintenance program will keep emergency repairs to a minimum.

Jobs should be planned to take full advantage of an employee's skill. A journeyman electrician doesn't have to be told how to cut and thread conduit; a nonskilled workman must be shown.

• Inventory control of maintenance supplies is lacking in many plants.

Many maintenance departments stock as many as 100 types and grades of lubricants when they need only 25.

Mr. Cyrol says it is easy to take $25,000 a year out of the cost of supplies even in medium-size plants; a $50,000 annual saving isn't unusual. He suggests:

Let the purchasing department find the best value. Determine the quality of the product needed to do the job. Measure the use rate of supplies (it will cut down on pilferage). Decrease the number of items you stock. It is estimated that it costs 10 to 25 per cent of the total value of an inventory just to maintain it.

• The application of tighter controls on maintenance may require more and better supervision than you now have.

Administrative costs in maintenance management can run 1½ to 15 per cent of labor costs, depending on the degree of control you exercise.

Big ships were added to product line as Avondale Shipyards Inc. diversified

Shipbuilder Grows and Diversifies

UTILIZATION of heavy production facilities normally used in shipbuilding for other forms of manufacturing has made Avondale Shipyards Inc., New Orleans, one of the most diversified builders on the Gulf Coast.

When James H. Bull, now president of Avondale, joined the company in the year it was founded (1939), the meager facilities of the yard were used primarily for ship and barge repair. With additional work, the little company (founded on $15,000) added to its facilities and prospered into its present complex of several divisions.

Avondale is now well established in numerous fields other than shipbuilding.

The diversification it attained has been applied to the manufacture of pressure vessels, sugar mill machinery, components for locks and clams, unloaders, castings, rubber linings, and porcelain enamel "package" buildings.

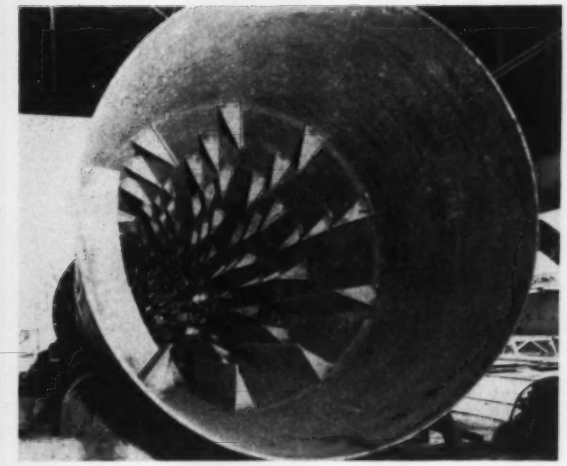
Avondale has many facilities, including a complete foundry; an electronically controlled, 18 by 18 ft, unlimited length, stress relieving furnace; plate rolls with a capacity up to 4½ in. thicknesses; a lifting device capable of handling loads as heavy as 600 tons; and numerous other pieces of heavy duty equipment.

• **Pays Top Wages**—The company believes in good wages for its employees. Signs at the yards proclaim: "You Are the Highest Paid Marine Workers on the Gulf Coast," and list rates paid in comparison with the next highest on the coast.

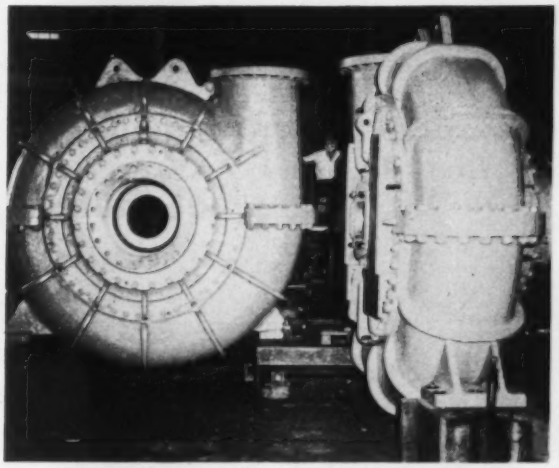
The company, a subsidiary of the Ogden Corp., New York, has four major production divisions: Main Plant (and executive offices) at Avondale, La., a few miles up the Mississippi River from New Orleans; the Harvey Quick Repair Yard, at Harvey, La., on the Harvey Canal in the New Orleans area; the Service Foundry Div., in New Orleans; and the Avoncraft Div., located at the main plant at Avondale.

• **Market Seeker**—The company is continuously investigating new markets for its varied products and services. For this purpose, it has created an Industrial Contracts Div.

Last year, Avondale Shipyards Inc. expanded its operations at the main plant to become a builder of big ships (up to 550 ft in length). It is constructing three, 10,760 ton, 18 knot freighters for the Delta Line of Mississippi Shipping Co. Heretofore, the company devoted its marine efforts to smaller work—barges



This rotary dryer shell, a heavy fabrication, is another example of diversification



Castings such as these for big centrifugal pumps are used on big marine dredges

of all types, lesser cargo vessels, Navy vessels such as LSTs and destroyer escorts, and special steel fabrication jobs. Contracts for the three freighters total $30 million. In addition, the company has a $33 million contract for two guided missile destroyers (DDG Class) and a $16 million contract for two, ocean escort vessels (DE-1037 Class) for the Navy.

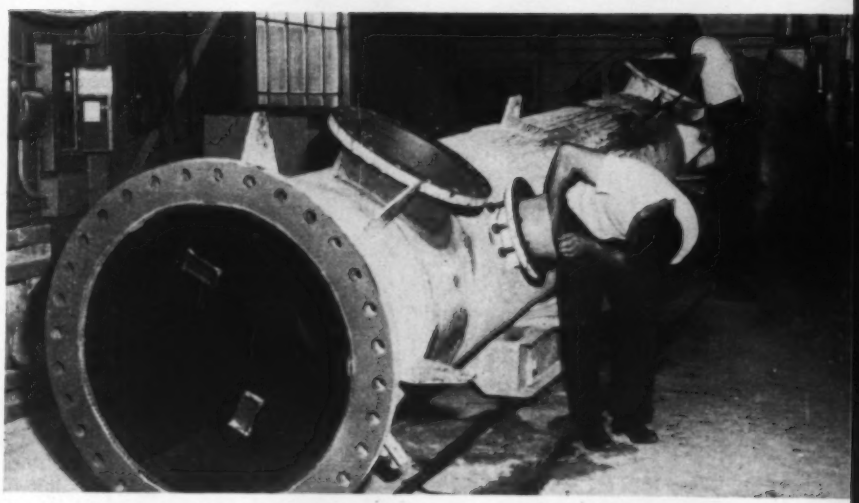
• **Serving the South**—While shipwork (including drilling rigs and tenders) comprises the bulk of activities, the company's unique combination of machining and fabricating facilities makes it possible to serve many other industries. It has some of the largest machine tools in the South.

The main plant (at Avondale) has, in addition to the shipbuilding ways and executive offices, the company's principal steel and pipe fabricating facilities; a machine shop; and two, gas freeing plants. Also located at the main plant are the rubber lining facilities, galvanizing plant, porcelain enamel plant, deep water repair docks, and a marine railway.

The Quick Repair Yard specializes in making quick repairs to vessels. Also located at this yard are machine shops, an electrical shop, and a shop for the repair and rebuilding of oil field equipment. Here, too, propellers that are cast at the Service Foundry are finish machined and stored, or sent to the vessel for installation. Stainless steel propellers of all sizes are a specialty of the company.

The Service Foundry, which Avondale bought in 1951 to obtain additional machine shop facilities, can cast nearly all grades of steel and nonferrous metals.

The Avoncraft Div., established in 1954, manufactures architectural porcelain enamel on steel. One of its specialties: The production of "package," porcelain enamel buildings for gasoline service stations.



Weldments are among other products made. If need be, they can be fitted with protective linings

Steel Exports Rise Again

An upward trend in exports of steel mill products continued in June, reaching the highest level since October, 1957. Cold rolled sheets and tin plate accounted for most of the increase. Imports dropped to the lowest point since November, 1958, reports the Commerce Department.

June exports totaled 382,000 net tons, an increase of 62,000 tons over May and 170,000 tons over June, 1959.

Basic Research Expenditures Double Since 1954...Labor Surplus Areas Get More Aid...More Procurement Gripes

Where Basic Research Money Comes From

	1954	1958
	(Millions)	
Federal government	$195	$423
Industry	147	249
Colleges, universities	62	111
Other nonprofit organizations	28	52
Total	$432	$835

Source: National Science Foundation.

BASIC RESEARCH expenditures have more than doubled since 1954 because of demands of the Space Age, says the National Science Foundation. The total this year will be about $1 billion, or around 8 per cent of the nation's total research and development budget of $12 billion.

Industry's big role as a source of basic research money is indicated by the figures above. From 1954 to 1958, its expenditures rose 69 per cent, from $147 million to $249 million. Federal government activity increased 117 per cent.

● **NEW LATIN AMERICAN AID** — The U. S. will pour about $500 million into nations south of the border (with the exception of Cuba) over the next few years. Congress will later decide how fast and where the money should be spent. Most of it will go to public projects designed to expand the growth rate of national economies, such as the utilization of land and natural resources.

U. S. government officials connected with development programs are reportedly shying away from projects which allow development of industries—steel, for example. Reason: Public projects offer less opportunity for individual gain among citizens of the donee country.

● **DEPRESSED AREA AID HIKED**—Persistent labor surplus areas are getting more federal programs. The Post Office Department says it is spending more than $16 million in seven states for the expansion and modernization of facilities. The Defense Department says $163 million of $285 million worth of contracts awarded to labor surplus areas in the first quarter went to those with persistent surpluses.

The Office of Civil & Defense Mobilization established the concept of persistent unemployment in July so it could channel more work to communities hardest hit over the longest period.

● **DEFENSE CONTRACTOR SELECTION** — The Pentagon is defending itself against the charge that too much defense procurement is handled by negotiation rather than formal advertising. It cites the Mauler missile as an example of how negotiation really is an open, aboveboard system for finding the best contractor and does not eliminate any capable manufacturers. When the missile was ready to be contracted for, 97 companies were briefed on the project by the Army. Thirty-one companies submitted proposals. Convair Div. of General Dynamics Corp. was the winner.

Defense claims that 80 per cent of its procurement dollars go into highly specialized weapon systems requiring much research and development work. "You can't formally advertise for an antimissile system," says Defense. Follow-on contracts to the original R&D effort offer more opportunities for more companies to get into the business, but Defense reasons: "It would be foolhardy to suggest the purchase of additional B-52 bombers from anyone but Boeing, or additional Atlas missiles from anyone other than Convair."

Why all the noise?

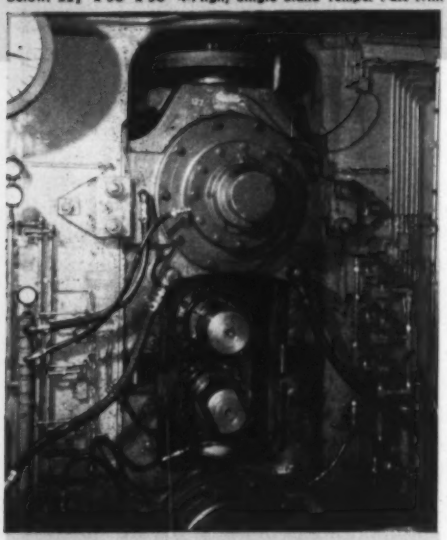
Congress is about to pass a bill requiring prime contractors to take more notice of the Small Business Administration's efforts to channel contracts away from the big defense contractors. Indeed, the bill could establish SBA procurement regulations alongside defense rules and force the primes to seek out SBA advice when choosing subcontractors.

● **METALS HEARINGS UNDERWAY** — Steel officials took the stand last Thursday to inform the Tariff Commission and the Committee for Reciprocity Information of the need for a new look in our negotiations with the members of GATT (General Agreement on Tariffs & Trade) in Geneva next month.

● **CAPITOL NOTES**—Lulu, the Navy's latest atomic depth bomb, is in production . . . Construction of second generation Titan bases begins in the fall; Minuteman bases in January (11 Atlas and 5 Titan bases are under construction at a cost of $635 million) . . . The Tariff Commission again refused to review the bicycle case—it's claimed that imports are seriously injuring domestic manufacturers . . . Industry will meet with the military at Ft. Bliss, Tex., Sept. 20 to review missile transportation problems.

MORGOIL
BEARINGS

Above: 21" x 56" x 56" 4-High, 4-Stand Tandem Cold Strip Mill
Below: 22½" x 56" x 56" 4-High, Single Stand Temper Pass Mill



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The demonstrated ability to meet high speeds, heavy loads and close tolerances made MORGOILS a natural choice for the back-up rolls on Inland Steel's new Cold Mills at the Indiana Harbor works.

Both the new 4-High, 4-Stand Tandem Cold Strip Mill and the new 4-High Single Stand Temper Pass Mill are equipped with 44"-90 MORGOIL BEARINGS.

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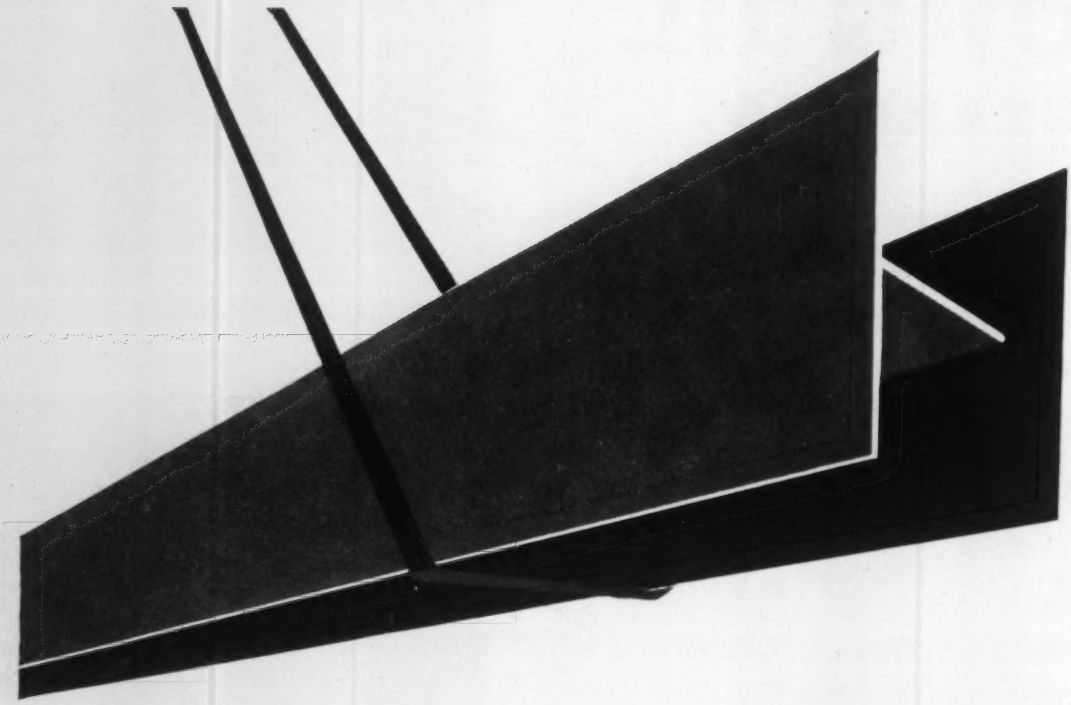

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NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

Pick the Right Materials

IT HAS BEEN called value analysis, buying by function, materials management, materials brainstorming. It has been under the control of engineering, purchasing, production, materials specialists, top company executives. It has been systematized, broken up, run by seat-of-the-pants methods. But no matter what you call it or how you approach it, choice of the best material is a key to profitability, even to survival, say metalworking managers.

Watch Those Objectives

The consideration of function first, material second, is basic in effective choices, STEEL found in interviews at metalworking plants all over the country. At Motorola Inc., Chicago, the purchasing department is charged with buying from venders after reviewing with them the requirements and restrictions placed on the component or unit. "We buy functions at the lowest cost we can," says Motorola.

The functional approach removes limitations on materials, permits design changes if they will reduce costs or improve the product, allows suggestions from supplier specialists to help company engineers. For example, changes in resistance can be used to measure temperature. A coil of fine wire may be used for the purpose, but so can a certain type of natural diamond, says the Diamond Research Laboratory, Johannesburg, South Africa.

Once the choice is made, you can't consider the matter closed, STEEL was told by many experts. "This materials field is more changeable than the stock market," one Midwestern aircraft metallurgist warned. "The right choice today may be the wrong one tomorrow, due to new materials or to price changes."

Destination, Not Routes

The functional approach starts with the choice of the objective. Sometimes, the total of requirements can be divided into two groups, distinguishing between necessary and desirable. And there may be restrictions, such as maximum cost, plant limitations. Tungsten, lead, and uranium have been considered as counterweights for movable airfoil surfaces in airplanes. Lead has cost advantages and is used where its lower density is not a disadvantage. At present prices, tungsten and uranium could be competitive, scientists at Battelle Memorial Institute, Columbus, Ohio, report; but a shift from one to the other would entail changes in plant practice.

Environmental conditions and expected service life are part of the functional approach. In the design of nose cones for missile re-entry, the basic problem centers on the extremely high temperatures caused by friction. For long term stability at such temperatures, there's no question but that refractory materials would be necessary. But for one-shot use, time at high temperatures is a matter of minutes or seconds. So plastics can be used. The mechanism is called ablation. Vaporization of part of the plastic material cools and protects the underlying layers, carries away some of the heat.

Mahogany makes a fine material for builders of model dies for autos. But Creative Industries, Detroit, has replaced wood with a plastic paste. It says the new process can save as much as 30 per cent of the time required to construct master models. Another advantage: The plastic paste, made by Ren Plas-

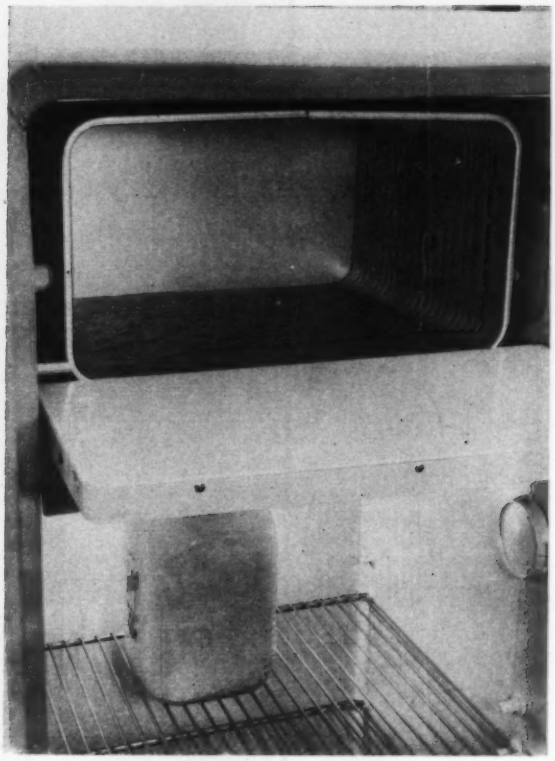
EVAPORATORS for home refrigeration units, can be built to resist damage by using a composite material, says the Metals Div., Olin Mathieson Chemical Corp., New York. It uses two different aluminum alloys to overcome a service difficulty.

Some years ago, many manufacturers of home refrigerators replaced tubed evaporators with tube-in-sheet types. A "resist" is silk screened on one sheet of a sandwich; after it is covered with another sheet of the same aluminum alloy, the composite is rolled. A bond is secured everywhere except in the resist pattern. After rolling, the edge is trimmed and tube formed by applying hydraulic pressure while the sandwich is confined between platens. Tubing is attached for circulating the refrigerant.

Some service failures were caused by attempts to remove frost and ice cube trays or food containers with sharp, pointed instruments. The raised tubing was the trouble area.

Product engineers at Olin Mathieson's Roll-Bond plant at East Alton, Ill., studied the problem and decided on a material change. They changed one of the sheets to a harder aluminum alloy.

When the tubing is inflated, the harder sheet deforms less than the previous type, making it smoother and less likely to be damaged; coils are, in effect, mostly on the outside of the evaporator unit. And the harder alloy is more resistant to puncture. Design changes in the tubing pattern had to be made, since the cross section of the tubed portion was decreased.



Here's how evaporator plates are used on the 1960 model, 9 cu ft, Westinghouse refrigerator. The next two photos show how a change in materials solved a problem

tics Inc., Lansing, Mich., permits easy change when designers modify their ideas. Sections can be readily cut down or built up.

The functional approach, applied to service conditions, led to the development of differential coatings on tin plate. The electrolytic tin plate processes permit control of the coating thickness, so that the depth of the deposit may be as much as four times as great on one side of the sheet as on the other. The outside of a tin can, in normal service, may not need as heavy a coating as the inside when such products as tomato juice are packed; costly tin is saved by differential coating. A special roller marks the thinner tin coating, so that the sheets are fed properly to the canmaking machinery.

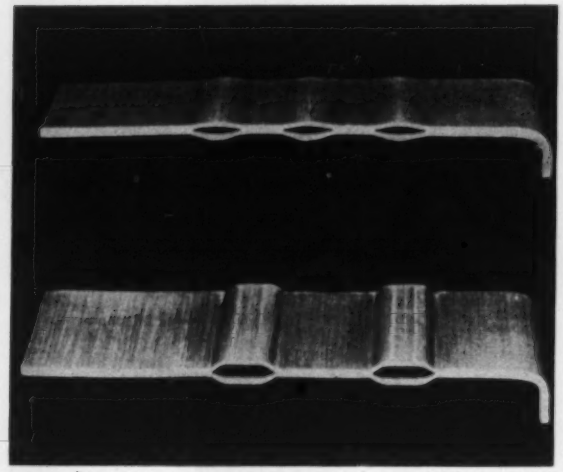
How About Standards?

Standard Pressed Steel Co., Jenkintown, Pa., points out that you can often save by sticking with standard components. Says Edward D. Clark, standards engineer: "Too many customers let a draftsman make a decision for a special fastener that will triple their fastener costs." One way SPS combats the tendency: On orders for slightly off-standard products, the customer gets two quotations—one just as specified, the other for the standard product most closely meeting the customer's needs. That way, the purchaser knows the cost of using the special. He may find he can save by taking the standard.

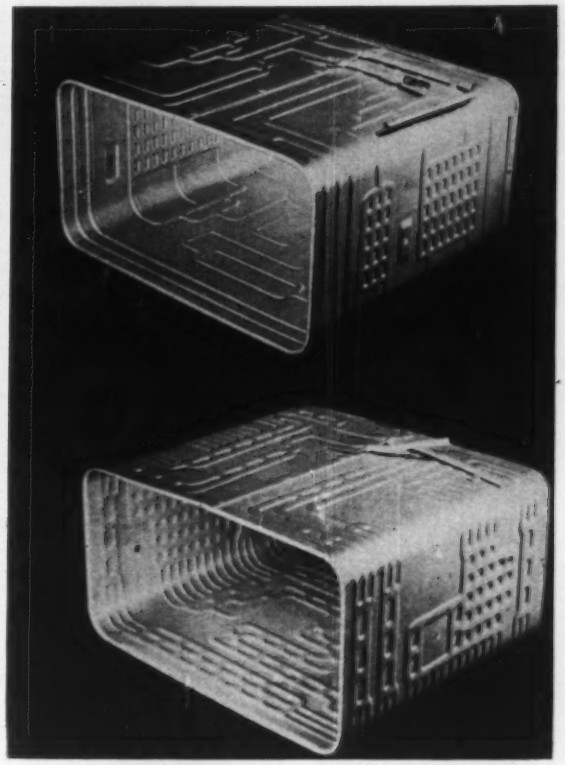
You can substitute one standard with another, combining it with the functional approach to save costs. Halstead & Mitchell, Zelienople, Pa., cut welding time and scrap losses in fabrication of housings for cooling towers, condensers, and evaporators by using wider, cold rolled sheet steel. Jones & Laughlin Steel Corp., Pittsburgh, supplied sheets 72 in. wide, replacing 48 in. widths. One part calls for only 32 in. of welding vs. 104 in. before; on another part, welding requirements dropped from 300 to 132 in. Added benefit: Improved appearance.

Scouting for Materials

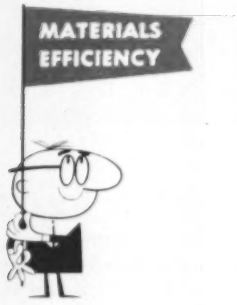
Methods used to find the right material vary considerably—and the system probably isn't as important as attitude. STEEL found companies with materials sections in engineering, in purchasing, or as a staff group; some companies call in outside designers or specialists to take advantage of their range of information. At Emerson Electric Mfg. Co., St. Louis (see STEEL, Aug. 22, pp. 49-52), everyone gets into the cost and profit battle, and all benefit. Says L. A. Dahlheimer, Emerson's director of purchases: "We talk to every sales representative who calls,



Difference between tube cavities formed from composite alloy (top) and softer material (bottom) is shown in cross section. The upper surface in the top photo is the harder alloy, which provides a smoother, harder surface, less likely to be damaged



Evaporator units before (top) and after material change. The inner surface of the new unit has about twice the tensile strength of the other



asking him to help us cut costs and boost quality. We're always on the lookout for new materials."

Some plants use committees at this stage. They feel that it gives people from design, production, and engineering a chance to get into the act. Ideas are sold before they go into production, and the differing viewpoints help assure that more possibilities are considered.

Use Suppliers

Suppliers are anxious to see that information on the materials they can supply gets to anyone who can use it. Austin J. Paddock, president, American Bridge Div. of U. S. Steel Corp., Pittsburgh, says his company is "contacting advanced design, styling, research, and operating people, with a penetration hardly dreamed of a few years ago." He too advocates the functional approach: "Are you buying so many pounds of material, or are you buying certain engineering properties? Have you been calculating the cost of a material or the cost of a function?"

Another place where suppliers can help is in the obtaining of product information on materials not widely available. Maybe there is a new material coming along which is just what you need to solve a problem: you'd have little chance to learn of it except through your vender. You give him the best chance to help if you tell him what you want in results; don't limit him to a specific material. Says John E. Doxsey of the Steel Service Center Institute: "A surprising number of designers and purchasing people don't ask for information, or ask the wrong question. Many a user has moved heaven and earth to find a supplier of a special steel when what he really needed was a common (and cheaper) grade which almost any good steel service center carries."

Keep the Door Open

A metallurgist for a process equipment group feels that a large part of his job is to advise or teach. "When I first came here," he says, "the design engineering group seemed to feel that there were three classes of ferrous materials—black iron, galvanized, and stainless steel." Contrast that with Mr. Paddock's statement (U. S. Steel alone "has 10,000 steels") and you can understand the metallurgist's dismay. But there is a happy ending. His "lessons" have been absorbed. One result: A reduction in service failures.

New materials, improved materials, new shapes and sizes often make it possible to manufacture a product that was in the impossible category. Wire Equipment Mfg. Co., Trenton, N. J., had been making an air powered, centrifugal pump for liquid metals and molten salts. Steel and alloys were used in

VALUE ANALYSIS, a term General Electric Co. coined, considers function and cost. Application of the principle has helped to hold costs in line without sacrificing quality or performance.

The brush holder stud pictured had been manufactured from steel rods and precut phenolic plastic tubes. The rods, 4 or 5 in. long, were threaded on one end, inserted into the plastic tubes; ⅜ in. of tubing extended beyond the rod to prevent contact with other metallic parts. Unavoidable size variation between tubing and rod meant a cementing operation was needed. Cost per part: $1.74.

National Vulcanized Fibre Co., Wilmington, Del., now molds the phenolic plastic tubing on two studs simultaneously, with the unthreaded ends of the stud separated by ¾ in. After molding, a cut is made between the sections. Now the end is closed in, so no electrical contact can occur; cementing is not necessary, yet the bonding is complete and uniform. New cost per part: 70 cents.

earlier versions. But they did not stand up in all uses. The company looked for something which had the necessary physical properties and would not be wet by aluminum—on the premise that this was the first step in the attack. A new ceramic material showed promise: Silicon-nitride-bonded silicon carbide, a composition which can be accurately finished, stands up to heat, abrasion (it's an abrasive itself), corrosion, and is not wet by such metals as aluminum, silver, copper.

L. D. Seymour, president of the company, reports: "We have been developing this new design with ceramic materials for about five years. While we hope to improve it further, the pump has been used in a number of large commercial installations and has given a good account of itself."

Constant Vigilance

You still haven't finished after you've chosen a material for a job. John Repp, head of value analysis for Emerson, feels that a product made the same way for two years is probably ripe for improvement. One company president confessed to STEEL: "Only in the past year have we started to review our costs on standard jobs—and then only because our profit margin was slipping. On more than half of them, we were making no profit at all, or even taking a loss. They're all being checked and re-evaluated now. It took quite a shock to do it, but I think we're awake—and we've set up a regular program to review each part going through our plant at least once each year. It's too important to leave to chance, and it won't be so hard to handle piecemeal. We're not going to get caught with our profits dragging again."

One area where the company turned up potential profits: Methods of production. Questions like these were asked: Can we use a steel which will eliminate heat treatment? Can we replace a carbon steel with an alloy . . . heat treating to greater strengths and getting less distortion . . . saving on total cost and reducing finish grinding? Can we use a cheaper material and plate it, or paint it, or plastic coat it, to get the needed corrosion resistance? (The plater came up with some new methods for getting a brighter plate with little or no buffing).

Today's metalworking managers are trying to pick the right material in the design stage, where it's the cheapest; they're changing designs where a change in materials will cut costs, improve the product. They're getting information on new materials from customers, consultants, computers, committees. They're asking venders and employees for suggestions. They know, as one company president put it: "The job of getting and using the best material is the job of everyone interested in seeing that the company makes a profit."

Materials Efficiency

Use Suppliers' Brainpower

That's the topic of the article coming up Sept. 12 in STEEL's 1960 Program for Management. For a free copy of any or all articles in this 13 part series on materials efficiency (which started July 4 and is running every other week in the second half of this year), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. Also available is the companion series, on production efficiency, which appeared during the first half. Use of material like this may win you $1000. For details, see Pages 5 and 6.

SEE THE LOW COST IBM 1620 DEMONSTRATE AUTOMATIC PROGRAMMING OF NUMERICALLY CONTROLLED MACHINE TOOLS AT THE PRODUCTION ENGINEERING SHOW IN CHICAGO, SEPTEMBER 6th-16th. COME TO SOUTH HALL, NAVY PIER, BOOTHS 428 AND 430.

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- **Infinitely variable feed rates which can be changed while the tool is in the cut.**

Simple push button pendant controls and clock-type positioning dials accurately locate head, table, saddle, and spindle.

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POWER CONTROLLED Simple pendant controls start, stop and speed of spindle as well as all directional movements of head, table, saddle and spindle. Large, easy to read clock-type dials show exact position of work in relation to tool. Infinitely variable feed rates and four traverse speed rates. Power Draw Bar for fast and easy tool change. Fully automatic hydraulic binders for head, table and saddle.

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COMPACT AND RUGGED The new Bullard Dynamill* H.B.M. is compact in design — lower in overall height — requiring less floor space, yet has more built-in rigidity and durability.

EASY MAINTENANCE Automatic lubrication throughout — fewer parts — fewer adjustments — easily accessible.

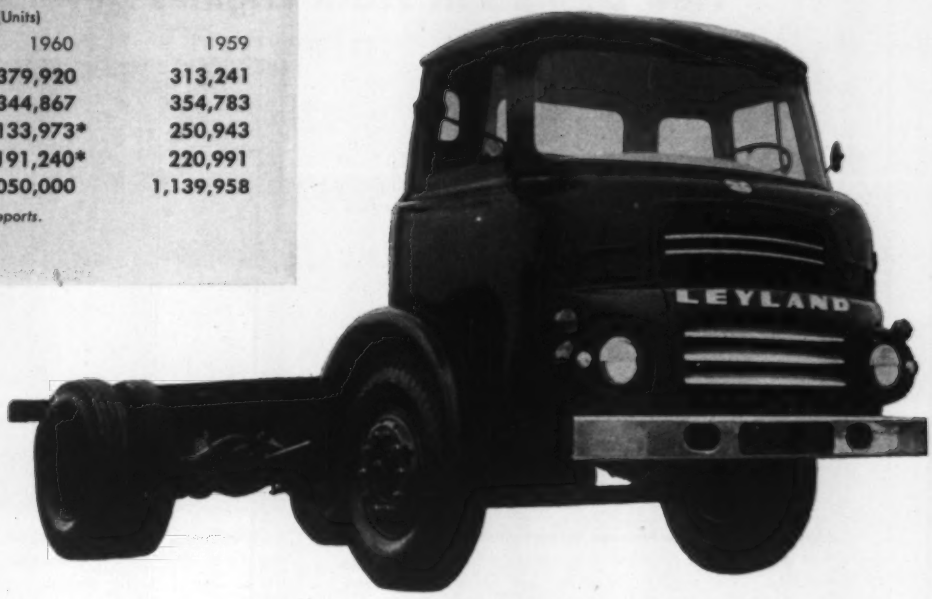
"YOU CAN'T BEAT A BULLARD"

U. S. Truck Production

(Units)

	1960	1959
1st quarter	379,920	313,241
2nd quarter	344,867	354,783
3rd quarter	133,973*	250,943
4th quarter	191,240*	220,991
Total	1,050,000	1,139,958

Source: *Ward's Automotive Reports.*
*Projected.



British import invades heavy duty diesel field . . .

Truck Builders Shift for Big Push in 1961

AFTER TWO MONTHS of disappointing sales, Detroit now estimates that truck sales probably will peak out around 930,000 this year vs. the 1.2 million predicted.

Production isn't apt to go over 1.1 million, even though first half, 1960, output of 724,700 is second only to 1951's first six months.

One sales chief says truck purchasers are buying for improvement and economy replacement, but not for expansion. He adds that many potential customers frankly admit they're holding off until after the November election before making capital equipment spending plans.

The delay will make it difficult for the experts to predict 1961 sales. Growing export markets plus introduction of more compact trucks by Ford and Chevrolet could boost sales above 1 million in 1961 if the industry pushes hard. Big Three truck builders privately are talking about 910,000 to 950,000 units.

• **Compact Entries**—Ford's Econoline trucks will be out shortly. They're similar to the Volkswagen van trucks in appearance and capacity. They'll probably be priced slightly higher than the VW models which start at $1860 port of entry, New York. Ford already has several entries in the compact truck field.

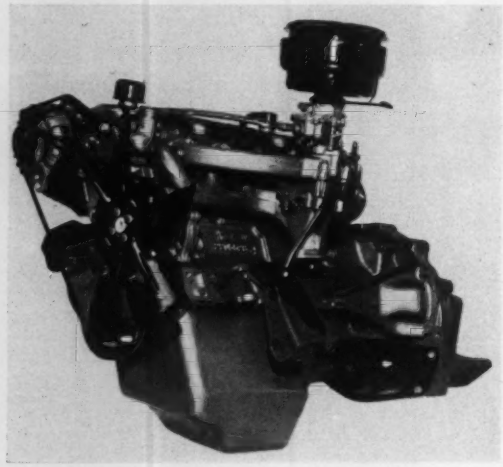
Chevrolet's compact truck is more in the panel class and is built around the Corvair station wagon body. Aim: To provide a line of small delivery models not available in regular Chevrolet trucks.

• **Exports**—Detroit hopes that its compact trucks will combat VW. It's also looking to a growing export market. First half exports will total better than 150,000 units compared with 106,000 last year. Carl H. Hahn, general manager, Volkswagen Corp. of America, says he welcomes this country's re-entry into the world vehicle market. He still expects 40,000 VW trucks will be sold in the U. S. this year and predicts better than 50,000 sales next year.

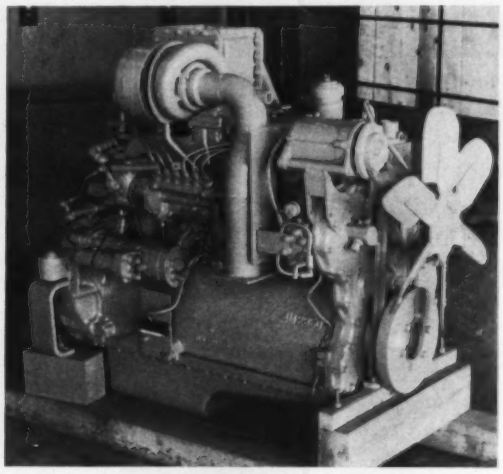
Overseas producers are starting to invade the heavy duty market too. British built Leyland trucks in the 24,000 and 32,000 lb gross vehicle weight classes now are arriving in this country. They're powered by six cylinder, diesel engines and can carry 15,536 and 21,900 lb payloads.

• **Diesels**—To achieve economy in larger trucks, the industry continues to push diesel engines for heavy duty, long haul jobs. Almost 35,000 diesel engine trucks were sold last year and it looks like diesel rigs will reach 40,000 or more this year even though total industry sales are lower. Next year should see a sizable increase in diesel sales. Ford will introduce the Cummins diesel

New Designs in Truck Engines Developed



Modern casting techniques have reduced thickness on this inclined, six cylinder, truck engine for 1961 Dodge models. Waterpump housing, oil filter pad, water outlet elbow, distributor and alternator housings are cast from aluminum. The 140 hp engine has been designed for easy maintenance. All routine servicing can be performed from the left side



Caterpillar Tractor Co.'s Engine Div. entered the trucking field this month with the introduction of its No. 1673 diesel truck engine. Its six cylinder, turbocharged and aftercooled powerplant of 4.5 in. bore and 5.5 in. stroke provides 220 horsepower at 2200 rpm. Caterpillar says its new engine fits 85 to 90 per cent of diesel trucks on the road.

in a heavy duty truck with an 80 in. tilt cab. Chrysler has made a deal with Perkins Ltd. to sell its line of British built diesels for industrial as well as automotive use.

J. H. Pitchford, managing director, Ricardo & Co. Ltd., Sussex, England, has told members of the Society of Automotive Engineers that he foresees a landslide of diesel sales for smaller, multistop delivery trucks too. He cites one study showing that total operating costs for a small diesel engine were $1042 for the year compared with $1347 for a gasoline engine under the same operating conditions.

Another development that may boost sales of heavy duty diesels is the precombustion chamber. These small chambers are shut off from each cylinder by valves. The engine starts on gasoline, then switches to diesel fuel after warmup.

To remain competitive with diesels, Ford has announced a 100,000 mile or 24 month warranty on its superduty, gasoline truck engines. GMC Truck & Coach Div., Pontiac, Mich., says its Twin Six (V-12) gasoline engine has been a strong seller because it costs one third less than a comparable diesel engine, yet has been giving 4.5 to 5 miles per gallon vs. 6 to 7 for the diesel. GMC agrees that operators will have to run them 100,000 miles or more a year to make this kind of investment pay off.

• **Advances**—Like passenger car designers, truck engineers are looking for more efficient material applications. Designers are using more of the high strength, low alloy steels (950 series) for truck frames. Aim: Lighter frames, more versatility in design.

Olson Trailer & Body Builder Co., Racine, Wis., has built an entire truck body using interlocking aluminum extrusions developed by Reynolds Metals Co. The extruded body weighs 4700 lb.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654 242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
7 Mo. Totals	4,243,955	3,839,422
August		239,149
September		258,151
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
July 23	112,179	124,446
July 30	107,019	122,518
Aug. 6	103,504	108,240
Aug. 13	84,139	72,603
Aug. 20	46,865†	31,848
Aug. 27	35,000*	18,335

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Vaughn Haynes, right, manager of production engineering, discusses "trap" line scheduling with Wilfred Pascoe, superintendent of press room.

Chrysler blanks strip steel by "trap" shearing on Wean coil processing line

Trapezoidal shearing from coil is, in many cases, the most economical way to prepare blanks for subsequent press operations. Two, independent, pivoting shear heads allow selection of the most economical proportions of the blanks for the finished shapes. This "tailoring" of the material to the end parts eliminates much of the material loss that would result if these same parts were stamped and drawn from square-cut sheets.

Wean has designed and built almost all of the "trap" shear lines used today. The installation shown is at Chrysler Corporation's mammoth Twinsburg, Ohio stamping plant. This Wean coil processing line incorporates strip cleaning, flexing, leveling and shearing operations that turn as-received mill coil into sheet, ready for press work.

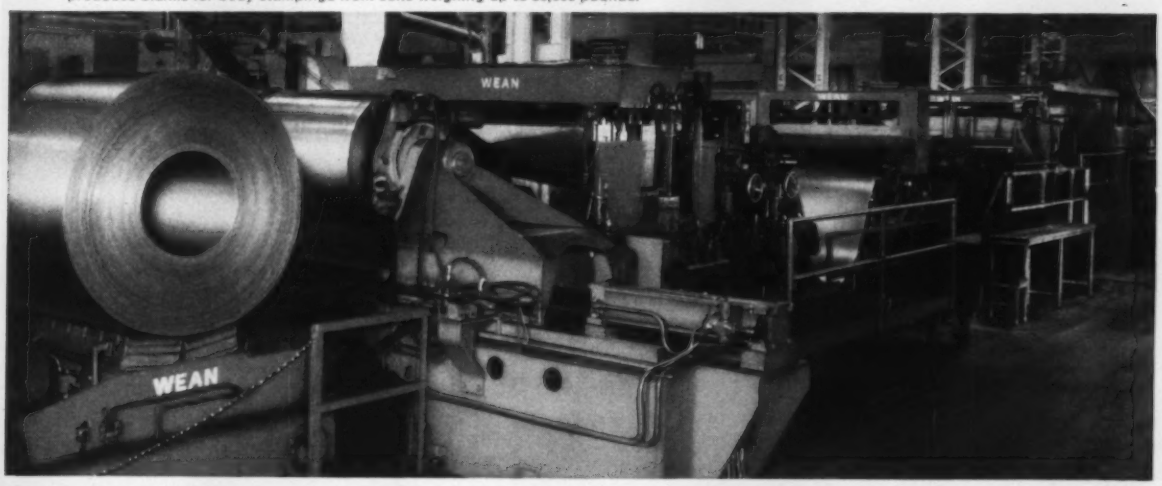
Today, more and more alert metalworking firms are turning to coil processing as one of the answers to rising production costs. If your firm uses approximately 500 tons/month of flat-rolled steel, you may be missing major material and overhead savings if you still purchase in sheet form.

An experienced Wean representative will be able to tell you, or your production executives, if coil processing can cut your costs—and how much. Many firms have amortized the equipment costs involved within one year.

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO

WEAN

Wean trapezoidal shearing line at Chrysler's Twinsburg Stamping Division plant produces blanks for body stampings from coils weighing up to 30,000 pounds.



The customer who thought he got something special

A Gulf Coast oil refiner was in a hurry to build a new catalytic platformer. He needed a special analysis of seamless steel tubing—delivered from the mill in just the exact size and length. But, the refiner was afraid he wouldn't get the steel on time.

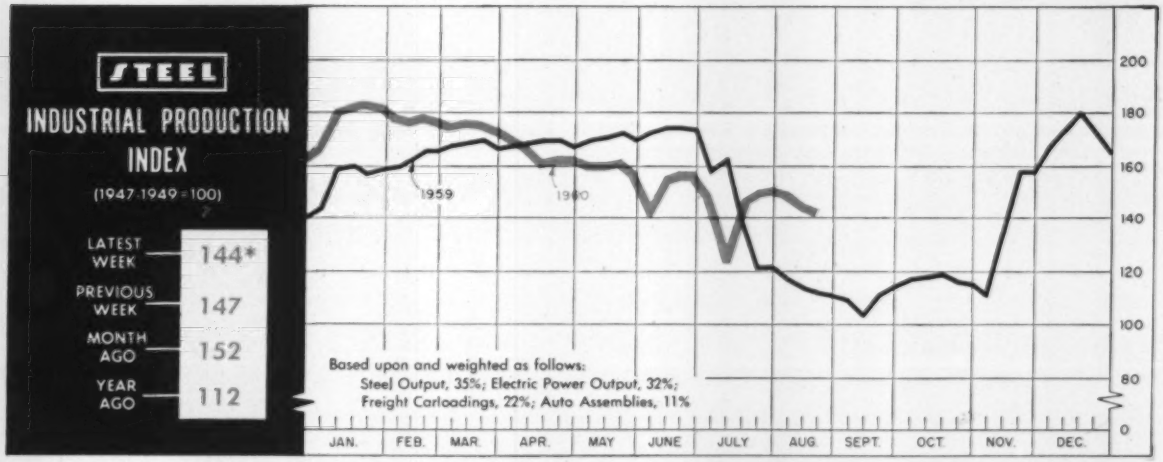
A team of Timken Company experts tackled the problem. They got the steel out on time—so fast that the refiner thought he received special treatment.

And he did—the very same special, individual treatment we're geared to give *every* customer—and do!

This order was routine for our team of metallurgical-production-operating people. Special jobs are right down their alley because they have the know-how and the facilities. You can call ours a tailored operation—but it's really more. The steel was babied all the way. Every modern quality control device kept an eye on the steel all through the melting, rolling, piercing, finishing. It passed every inspection for surface, size and quality and there wasn't a minute's delay. That's the kind of special treatment that's made the Timken Company a leading producer of special quality fine alloy steel.

If you want your steel to receive special treatment, give your next order to the Timken Company, where *every* order is special. And for help in solving your steel problem, consult our metallurgists. They've probably solved a problem similar to yours dozens of times.

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*



*Week ended. Aug. 20.

Auto Changeovers Brake Economy

THE NATION'S economy lost a little more momentum last week. STEEL's industrial production index dropped from 147 to 144 per cent of the 1947-49 base period.

But the fourth consecutive drop in the index cannot be attributed to a general softening. Shutdowns for the big model changeover in motordom accounted for all the decline in the index. Power generation, after a slight setback, turned up again. Steel production was higher than it was the previous week. And the seasonal upturn in carloadings is expected to be on schedule.

• **Where They Stand**—With most auto companies closed down for changeovers or slowly building up new model production, output fell below 47,000 units in the week ended Aug. 20. More than 84,000 units were turned out during the previous week. At changeover time last year, assemblies stood at 31,561.

Chevrolet finished its 1960 model run, and except for early assembly of the new Buick Special, other GM divisions are down. Most other '61 production won't get underway until Sept. 6.

Chrysler Corp. is in low gear on 1961 production. American Motors and Studebaker-Packard have completed their changeovers and should be reaching full '61 output now.

Ford production is scheduled to resume today. The Falcon model changeover took only two days. Comet production set records for 1960 cars right to the end of the model run.

And though early August sales were regarded as disappointing, Detroit sources feel there will be few problems with old model clearances.

• **Loadings Slack**—Despite the possibility that a good deal of the current business decline can be traced back to Detroit, generally soft conditions do prevail. Intercity truck traffic is under last year's pace, and freight carloadings are less than 1 per cent above it.

The lower-than-expected shipping

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,552[1]	1,558	332
Electric Power Distributed (million kw-hr)	14,700[1]	14,622	13,648
Bituminous Coal Output (1000 tons)	8,050[1]	7,840	7,197
Crude Oil Production (daily avg—1000 bbl)	6,850[1]	6,834	6,823
Construction Volume (*ENR*—millions)	$455.1	$435.5	$412.2
Auto, Truck Output, U. S., Canada (*Ward's*)	63,640[1]	96,827	84,086
TRADE			
Freight Carloadings (1000 Cars)	605[1]	600	544
Intercity Truck Tonnage (changes from year ago)	−3.8%	−1.3%	+17.3%
Business Failures (Dun & Bradstreet)	308	269	269
Currency in Circulation (millions)[3]	$32,184	$32,129	$32,051
Dept. Store Sales (changes from year ago)[3]	−1%	−2%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$27,844	$23,822	$24,938
Federal Gross Debt (billions)	$287.8	$288.2	$288.3
Bond Volume, NYSE (millions)	$24.0	$24.7	$24.8
Stocks Sales, NYSE (thousands of shares)	13,703	14,700	11,763
Loans and Investments (billions)[4]	$104.7	$105.1	$103.4
U. S. Govt. Obligations Held (billions)[4]	$27.0	$27.1	$27.2
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	229.6	230.6	220.8
All Commodities[7]	119.3	119.4	119.2
Commodities Other than Farm & Foods[7]	128.3	128.3	128.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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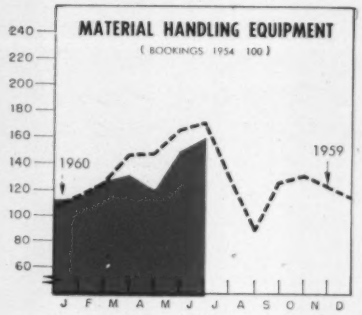
THE BUSINESS TREND



	1960	1959	1958	1957
Jan.	114.96	115.84	93.07	126.34
Feb.	128.74	124.77	93.49	139.29
Mar.	133.60	146.36	97.89	140.76
Apr.	122.41	147.28	122.36	132.67
May	150.33	164.45	118.04	157.95
June	160.23	170.72	131.15	121.57
July	.....	130.26	134.34	128.31
Aug.	.....	87.02	104.46	110.09
Sept.	.....	126.43	85.41	116.79
Oct.	.....	131.09	111.35	124.80
Nov.	.....	124.16	110.88	87.80
Dec.	.....	113.78	105.97	105.65
Avg	.....	131.85	109.87	124.34

Material Handling Institute Inc.
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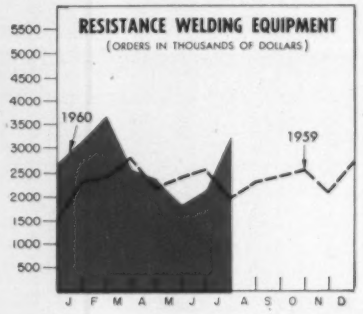


	Net Orders 1960	Net Orders 1959	Shipments 1960	Shipments 1959
Jan.	3,258	2,396	1,582	1,427
Feb.	3,732	2,457	2,563	1,889
Mar.	2,653	2,811	3,011	2,179
Apr.	2,446	2,258	2,943	2,193
May	1,871	2,407	2,310	2,019
June	2,205	2,597	3,267	2,702
July	3,244	1,980	2,221	2,269
Aug.	....	2,322	....	2,928
Sept.	....	2,435	....	2,113
Oct.	....	2,599	....	2,097
Nov.	....	2,131	....	1,597
Dec.	....	2,768	....	2,353
Totals	....	29,161	....	25,766

Resistance Welder Manufacturers' Assn.

activity is reflected in the backlog of railway freight car orders. On Aug. 1, 26,658 cars were on order and undelivered vs. 29,555 on July 1. On Aug. 1 of last year, the figure was 40,309.

But Harry C. Murphy, president, Chicago, Burlington & Quincy Railroad, believes: "We have turned the corner on carloadings." Mr. Murphy reports: "The manufactures and miscellaneous freight category has been showing firm gains." Grain shipments, delayed in Burlington's territory by severe rains, are now running well ahead of the year ago pace.

• **Profit Problems**—Although there is sound belief that the plusses in the last half will outweigh the negative influences (see STEEL, Aug. 8, p. 73), businessmen are still facing a major problem: Unit costs are up because output is not at optimum rates, but increases can't be passed along because of the absence of strong markets.

Widespread price softness contrasts with selective hikes in some lines, observes Prentice-Hall Inc., Englewood Cliffs, N. J. A weakening tone of investor confidence is also noted.

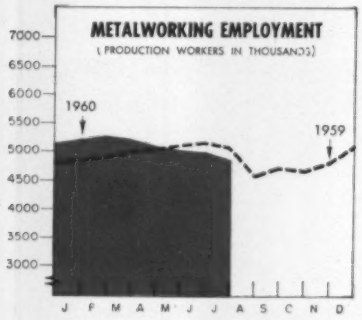
The chief trouble spots: Production of raw and semifinished materials. Prentice-Hall says there has never before been a postwar, nonrecession period in which the two stages of production have been out of line for so long. But the gap is "bound to narrow" by the end of the quarter.

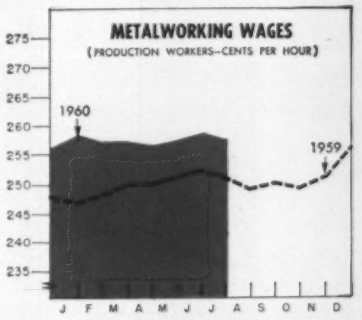
Another sign of the squeeze on profits: Business failures climbed to 308 in the week ended Aug. 11, for the highest level in seven weeks, topping the similar periods of 1959 and 1939. New business incorporations sagged to 14,676 in July, the lowest level since February. But oddly enough, the July total was the second highest July on record.

Phono Sales Spin Up

More than 330,000 more phonographs were sold at retail during the first six months of this year than in the same period of 1959, reveals the Electronic Industries Association.

The 21.5 per cent gain was accounted for by an 86.5 per cent rise in retailers' sales of stereophonic phonographs. Sales of monaural sets fell 43.7 per cent. Another bright note: Sales showed an upturn, rather than the traditional de-





1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
July	1,038	847	1,149	836	1,207
Aug.	628	815	1,138	849	1,132
Sept.	611	841	1,167	888	1,200
Oct.	602	812	1,147	893	1,208
Nov.	975	800	1,136	882	1,026
Dec.	1,039	841	1,166	892	1,172
1960					
Jan.	1,048	857	1,179	892	1,239
Feb.	1,052	863	1,191	890	1,245
Mar.	1,043	951	1,186	879	1,221
Apr.	1,020	837	1,176	860	1,187
May	993	837	1,159	855	1,174
June	969	811	1,156	858	1,127
July	927	824	1,131	843	1,100

U. S. Bureau of Labor Statistics.

1959	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
July	281	237	250	222	266
Aug.	264	238	250	222	269
Sept.	266	239	251	223	271
Oct.	265	236	252	224	270
Nov.	277	236	252	224	267
Dec.	285	241	254	227	273
1960					
Jan.	287	244	255	228	276
Feb.	286	243	255	228	275
Mar.	285	242	256	228	273
Apr.	285	242	255	227	271
May	282	245	256	228	272
June	283	245	257	230	274
July	280	245	256	230	273

U. S. Bureau of Labor Statistics.

cline, in the spring. June figures just disclosed by EIA, show stereo sales rose by nearly 26,000 units, monaural by 5100.

During the first half, transistor manufacturers notched a 67 per cent gain over 1959 unit sales at the factory. June business topped May's by more than 1.3 million transistors.

Trends Fore and Aft

• The $2000-and-under price range is the fastest growing segment of the new car market, says *Ward's Automotive Reports*. In the 1960 model year just ending, nearly 1 million cars, representing 17 per cent of industry production, were priced in this market compared with a mere 3.4 per cent in 1959.

• Employment in nonagricultural establishments in July, seasonally adjusted, was maintained at the level which has prevailed since April. Over that period, a decline of about 100,000 in factory employment has been offset by increases in other lines of activity. Total unemployment, including students and recent graduates, declined by 400,000 in July to 4 million. The seasonally adjusted rate of unemployment was 5.4 per cent in July vs. 5.5 per cent in June. But insured unemployment rose more than seasonally during the month, reflecting layoffs in some durable goods industries.

• June sales by manufacturers of industrial material handling equipment registered a hike of nearly 10 points over May bookings (see table above). "The business being booked by manufacturers in our industry," says C. L. Fell, Material Handling Institute president, "is a reflection of the current high spending activity for plant and equipment. It also seems to be in line with the ideas expressed by many economists that a proportionately larger share of expenditures is going into equipment modernization rather than for new plants."

• Factory sales of electric dryers and gas washer-dryers continued an upward trend in July despite the traditional vacation period slump registered by total home laundry appliances. The American Home Laundry Manufacturers' Association says electric dryer sales rose 20 per cent (50,264 units were sold in July compared with 42,047 in June). Gas washer-dryers were up 6 per cent (2861 units in July vs. 2689 in June).

ED JOHNSON
Furnace Application Engineer, reports . . .

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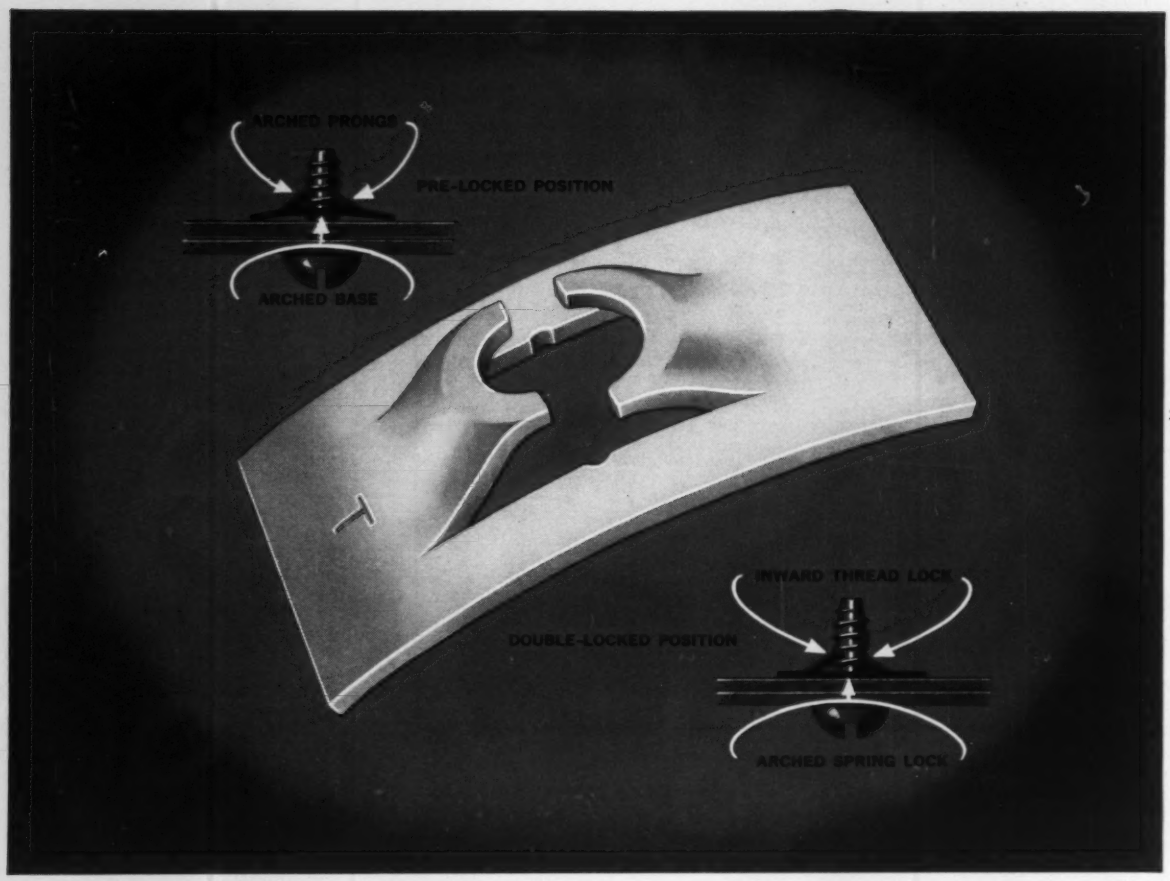

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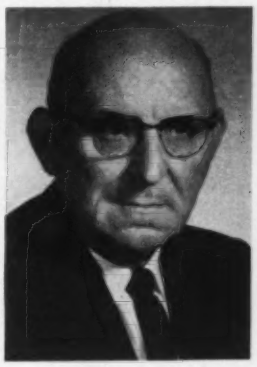
PHILIP J. PARKER
Sperry Products gen. sales mgr.



FRANK D. GOLL
Alcoa pig-ingot sales mgr.

FRANK LIPARI
J. I. Case plant mgr.

MARVIN L. BECK
GE-Switchgear mfg.-mgr.

Philip J. Parker was made general sales manager of **Sperry Products Co.**, Danbury, Conn., division of Howe Sound Co. He will be concerned with all company product lines and services, railroad and industrial. He was executive vice president, Peterson Machine Tool Inc., Merriam, Kans., acquired recently by Sperry Products.

Adolph O. Schaefer was made corporation metallurgist for **Struthers Wells Corp.**, Titusville, Pa. He was president of Pencoyd Steel & Forge Corp. He also was president of American Society for Metals (1956).

Glenn A. Wilson was appointed director of purchases and special projects for **Firth Sterling Inc.**, Pittsburgh. He continues as vice president-general manager of Strategic Metals Corp., and as vice president of Borolite Corp., both subsidiaries.

American Machine & Foundry Co., New York, elected two new vice presidents: **Richard W. Cook**, deputy group executive of AMF's Government Products Group; and **Joseph P. D'Arezzo**, director of planning. Both formerly had been divisional vice presidents of the company.

F. C. Warrington was made manager of steel plate sales, Midwest Div., **Pittsburgh-Des Moines Steel Co.**

Harold A. Wallace was named vice president-manufacturing, **Massey-Ferguson Ltd.**, and **John H. Shriner** was made vice president-marketing.

Frank D. Goll was appointed manager of pig and ingot sales, **Aluminum Co. of America**, Pittsburgh. He was assistant manager-sheet and plate sales.

Frank Lipari was made manager of the Stockton, Calif., plant of **J. I. Case Co.** He succeeds **T. J. Garbeff**, transferred to the general office in Racine, Wis.

John L. Hallman was named assistant general manager-steel sales for **Alan Wood Steel Co.**, Conshohocken, Pa. He is succeeded by **Frank J. Masterson** as manager-commercial research.

Ford Motor Co.'s Metal Stamping Div. named **Walter F. Miller** manager of the Cleveland stamping plant, and **Albert J. Chendes** manager of the Dearborn, Mich., stamping plant.

John Wandrisco, assistant to the president, was promoted to vice president in charge of corporate planning for **Latrobe Steel Co.**, Latrobe, Pa.

Donald A. Lyons was made director of customer services, **Greenlee Foundry Div.**, Greenlee Foundries Inc., Chicago. He was foundry superintendent.

William Haight was made superintendent of scheduling and material control, foundries, and pattern shops, West Allis, Wis., Works, **Allis-Chalmers Mfg. Co. Jay C. Warner** was made assistant to the director of manufacturing of Allis-Chalmers International.

Marvin L. Beck was made manufacturing manager for **General Electric Co.'s** High Voltage Switchgear Dept., Philadelphia. He succeeds **W. M. Anthony**, made manager of works utilities for Philadelphia Switchgear Departments. Mr. Beck was manager of the Appliance Motor Dept. plant at Murfreesboro, Tenn.

Robert M. Palmer was named field sales manager, **Hevi-Duty Electric Co.**, Milwaukee.

James F. Jones was named group executive in charge of the industrial product groups at **A. O. Smith Corp.**, Milwaukee. He succeeds **John Randall**, a vice president, resigned.

Edward R. Stevens was elected president, **Baldwin - Ehret - Hill Inc.**, Trenton, N. J. **Alvin M. Ehret Jr.**, former president, was elected chairman to succeed **William H. Hill**, who resigned that post to devote full time to foreign operations, which currently include plans for formation of a European subsidiary.

Harold Tulloch was made factory manager, **Vlchek Tool Co.**, Cleveland. For 14 years, he was operations manager of Utica Drop Forge Corp. Mr. Tulloch succeeds the late **Daniel A. Cummings.**

Claude Tribert was promoted to vice president of **Portland Industries Corp.**, South Portland, Maine. He continues in charge of operations.

Donald J. Wallace was made Chi-

T. MAURICE BUTLER GEORGE B. HOLMES BRIAN W. POLLARD

Burroughs manufacturing and engineering posts

cago district sales manager, **Coffing Hoist Div.**, Duff-Norton Co.

T. Maurice Butler, George B. Holmes, and **Brian W. Pollard** were made assistants to the vice president of the Manufacturing & Engineering Div. of **Burroughs Corp.**, Detroit. Mr. Butler was named director of engineering for general products manufactured by the division. Mr. Holmes was named director of administration, responsible for the division's financial and economic interests, including budgeting and cost control. Mr. Pollard was named director of engineering for data processing systems manufactured by the division.

George R. Vassily was made sales engineer of **Pittsburgh Engineering & Machine Div.** of Textron Inc. He was sales engineer with Mill Machine Div., Blaw-Knox Co.

Jerome R. Gross was named manager of the Cleveland district sales office of **Dravo Corp.** He will supervise sales activities of the Indianapolis and Cincinnati offices.

Simon A. Greenberg, formerly technical secretary of the American Welding Society, has opened an office in Flushing, N. Y., as a consultant in metals joining, manufacturing operations, quality control, and other industrial operations.

Roland M. Miller was made assistant superintendent, Electrical Dept., at **Republic Steel Corp.'s** Massillon, Ohio, steel plant. He succeeds **W. D. Risher**, retired.

Eugene S. Davidson was made Eastern regional sales manager, Conveyor Div., **Columbus McKinnon Corp.** He is at the office in Mountainside, N. J.

Bert E. Phillips was made general manager, Industrial Truck Div., **Clark Equipment Co.**, at Battle Creek, Mich.

Grant G. Orman was selected manager - industrial sales, **Stromberg-Carlson's Telecommunication Div.**, succeeding **Edgar R. Sears Sr.**, named manager, San Francisco branch. Stromberg-Carlson is a division of General Dynamics Corp.

Farrel-Birmingham Co. Inc., Ansonia, Conn., appointed **David Neill** manager of roll grinder sales to succeed **Robert J. Horning**, who transfers to the European office as assistant manager. Mr. Horning covered sales of roll grinders to the steel industry, Pittsburgh area. For the **Watson-Stillman Press Div.**, Rochester, N. Y., **R. John Hess** was made manager, metalworking equipment; **Bernard D. Ashbaugh** manager, plastics molding machinery. Mr. Hess was with Lake Erie Engineering Co. Mr. Ashbaugh was with Hydraulic Press Mfg. Co.

Darrell V. Jarvis was appointed marketing manager, Burlington, Iowa, Div., **International Resistance Co.**, Philadelphia. He was Midwest district sales manager.

Inland Steel Container Co., a division of Inland Steel Co., Chicago, has appointed **Clarence E. Johnson Jr.** manager, Chicago plant, and **Donald E. Malcolm**, manager-industrial engineering for all its plants. Mr. Johnson was with Plastic Products Inc., Winona, Minn., and Mr. Malcolm was with Standard Products Co., Cleveland.

Kaiser Refractories & Chemicals Div., Kaiser Aluminum & Chemical Corp., named **James R. Bachman** manager of its basic refractories laboratory at Milpitas, Calif. He succeeds **Berton G. Altmann**, named assistant to the director of research and development. Succeeding Mr. Bachman as head of the Product Application Section at Milpitas is **Jacques R. Martinet. M. L. Van Dreser** was made head of the Product Development Section.

Paul Cherkas was elected president of **Measurement Control Devices**, subsidiary of Schaevitz Engineering, Pennsauken, N. J.

Krystinel Corp., Port Chester, N. Y., has added two men to its staff: **Roger S. Lynch**, sales manager, and **Eugene Schaffer**, chief engineer. Mr. Lynch was with Essex Electronics & Standard Winding Co., and Mr. Schaffer was consultant

DAVID NEILL R. JOHN HESS BERNARD D. ASHBAUGH

Farrel-Birmingham, Watson-Stillman posts

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Heppenstall and Midvale-Heppenstall Back-Up Roll Sleeves reflect the long experience of two pioneer sleeve producers. These sleeves enable you to roll record tonnages . . . decrease downtime . . . and effect over-all cost reduction. They give longer working life in today's high-speed mills because their up-to-the-minute design permits utilization of more effective forging and heat treating operations. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

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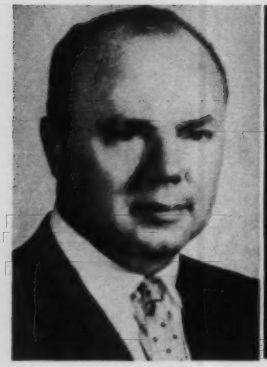


ADOLPH R. SCHAUB
Wing v. p.-mfg.

EDWIN LANGHENRY
Erico national sales mgr.

L. S. STERNAL
Timesaver Sanders sales mgr.

WARD K. JONES JR.
RB&W export sales mgr.

C. H. BRITTENHAM
Federal Pacific mfg. post

J. W. ARNOLD
president of Parsons Co.

(magnetic applications) to the company.

Ward K. Jones Jr. was made export manager of sales, **Russell, Burdsall & Ward Bolt & Nut Co.**, Port Chester, N. Y. He succeeds **William P. Rave**, retired. He was assistant office sales manager in Port Chester.

C. H. Brittenham was made manufacturing manager, Pacific Mfg. Div., **Federal Pacific Electric Co.** He is in charge of manufacturing operations at the new plant in Santa Clara, Calif. Before joining Federal Pacific, Mr. Brittenham was associated for 12 years with Square D Co.

R. C. Bown was made sales manager, Control Dept., **Allis-Chalmers Mfg. Co.**, Milwaukee. He succeeds **G. G. Brooks**, transferred to the associate company, Consolidated Systems Corp., Monrovia, Calif., in charge of industrial systems. Succeeding Mr. Bown as manager of the A-C Rectifier Section is **W. G. Williams.**

J. W. Arnold was made president and general manager of **Parsons Co.**, Newton, Iowa, division of Koehring Co. He was vice president-manufacturing, Hydraulic Press Mfg. Co. (Koehring division) at Mt. Gilead, Ohio, for five years before joining Parsons last April.

Gustav A. Hoffman returns to **Walworth Co.**, New York, as vice president-sales. He left the firm in the spring of 1959 while holding the post of assistant vice president in charge of Metropolitan Div. sales.

John A. Felty was made plant manager of **Colvin Laboratories Inc.**, East Orange, N. J.

John S. Barker Jr., general manager of the Calvert City, Ky., plant of **Pittsburgh Metallurgical Co. Inc.**, was elected vice president of the company.

Allistair Dunn was made executive vice president, **Vinco Corp.**, Detroit. He was director of manufacturing for Ohio Injector Co.

Adolph R. Schaub was appointed vice president - manufacturing for **L. J. Wing Mfg. Co.**, Linden, N. J., division of Aero Supply Mfg. Co. Inc. He joined the firm last January as manager of manufacturing. Previously with M. W. Kellogg Co., he most recently served as its production manager and shop superintendent at Jersey City, N. J.

Edwin Langhenry was made national sales manager for three divisions of **Erico Products Inc.**, Cleveland: Cadweld Electrical Connection Div., Caddy Arc Welding Accessory Div., and Caddy Toggle Clamp Div. He was Erico Midwestern regional sales manager. He now has headquarters in Cleveland.

L. S. Sternal was made sales manager, **Timesaver Sanders**, Minneapolis. He was with Coated Abrasive Div., Armour & Co.

Charles F. Stoudt, sales manager, **Duplicon Co. Inc.**, Westboro, Mass., was appointed general manager of Duplicon's new branch factory in Greensboro, N. C., which is scheduled to go into operation in January, 1961.

John B. Holland was made Automotive Div. manager, **Oakite Products Inc.**, Detroit.

J. H. Ehmonds was appointed manager of sales and market development; **K. D. Fraser** manager of technical sales and service for **Cooper Split Roller Bearing Corp.**, Carnegie, Pa.

OBITUARIES...

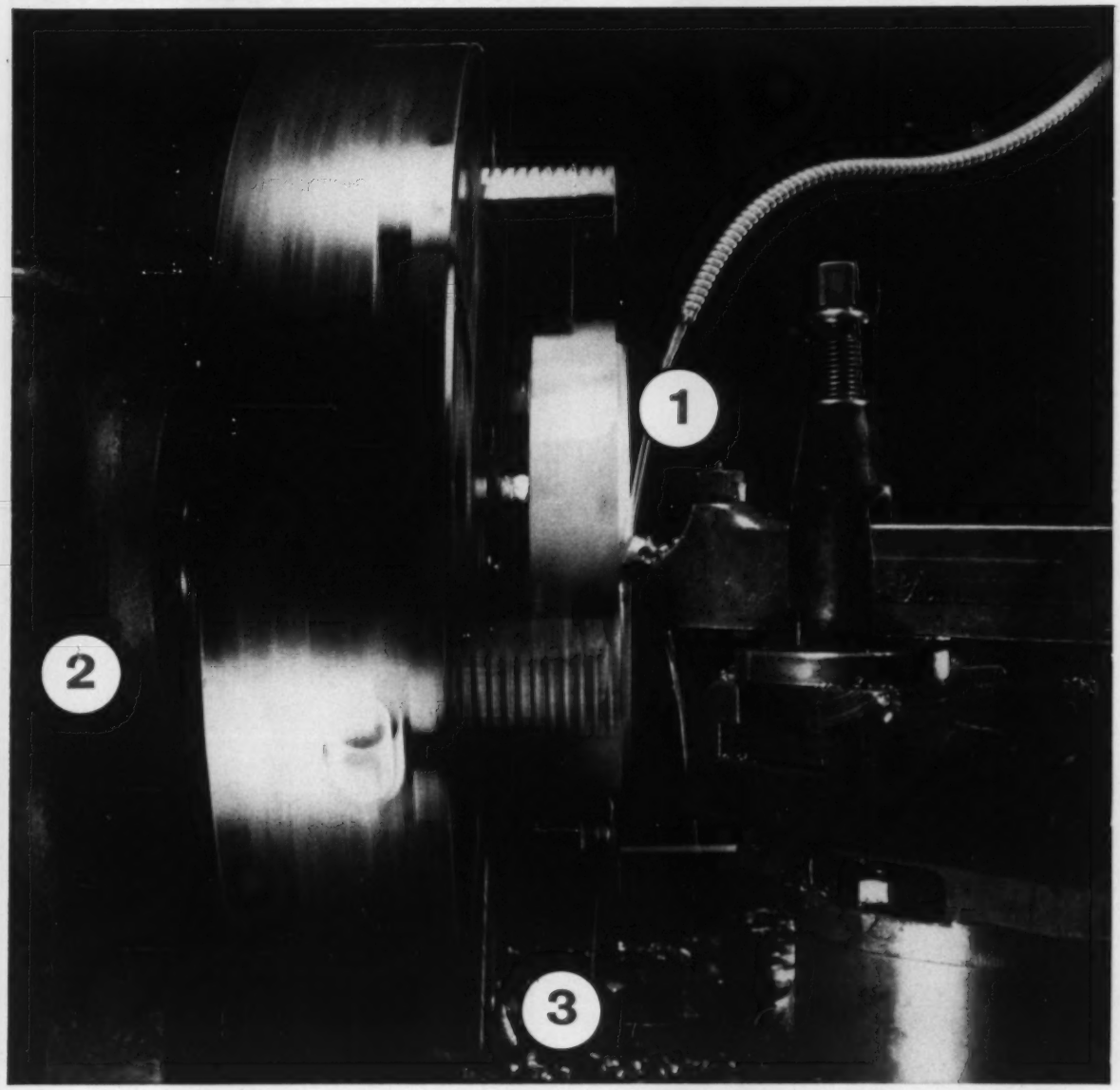
David S. Hughes, 51, production manager, Harvey, Ill., Works, **Allis - Chalmers Mfg. Co.**, died Aug. 17.

Orrin W. Barker, 60, retired vice president, **Kearney & Trecker Corp.**, Milwaukee, died Aug. 15.

Dr. H. K. Ihrig, 62, vice president-research, **Allis-Chalmers Mfg. Co.**, Milwaukee, died Aug. 22.

Robert D. Oldfield, 65, retired president, **Western Automatic Machine & Screw Co.**, Elyria, Ohio, died recently.

Stanley W. Ewing, 66, a sales representative for **International Graphite Electrode Corp.**, St. Marys, Pa. died Aug. 5.



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6229-S

Reserve Plans $120 Million Taconite Expansion Project

RESERVE MINING CO. is expanding its taconite processing facilities by about 50 per cent. The $120 million project will be completed by mid-1963 and will include these major elements:

- Increasing iron ore pellet producing capacity to more than 9 million long tons annually. Present capacity: About 5.5 million tons.
- Construction of a second coarse crushing plant near the company's mine at Babbitt, Minn.
- Building a second rail line along the present 47 mile railroad used to transport the crude rock mined at Babbitt to the processing plant at Silver Bay, Minn.
- Installation of a second car dumper at Silver Bay.
- Expansion of the fine crushing, concentrating, and pelletizing plants on the shore of Lake Superior. The largest of these buildings will be lengthened 800 ft to 2150 ft to house additional complete production lines.
- Doubling the maintenance and repair buildings at both locations, as well as enlarging the power production facilities, the boat loading equipment, and pellet stockpile area.

Reserve Mining is jointly owned by Armco Steel Corp., Middletown, Ohio, and Republic Steel Corp., Cleveland.

Principal contractor for the project is Hunkin-Arundel-Dixon, organized jointly by Hunkin-Conkey Construction Co. (the sponsoring contractor), Cleveland; Arundel Corp., Baltimore; and L. E. Dixon Co., San Gabriel, Calif.

Add Foreign Outlets

H. K. Porter Company Inc., Pittsburgh, acquired Acieries & Ateliers de Construction de Marpent, France, producer of steel, railway cars and components, and a variety of other industrial items.

Rust-Oleum Corp., Evanston, Ill., opened a plant in Haarlem, Holland. The 30,000 sq ft facility has a daily capacity of 2000 gallons of rust preventive coatings.

Alukon International Ltd. has been made a part of Alcoa International Inc., foreign marketing subsidiary of Aluminum Co. of America, Pittsburgh. Alukon is a leading marketer of architectural aluminum products outside the U. S. Its principal subsidiary is Alukon S.A., Mexico City, Mexico.

Hydrogen Capacity Upped

Air Products Inc., Allentown, Pa., is operating its new Hopewell, Va., plant, producing 18 million cu ft per month of ultrahigh purity, gaseous hydrogen. Another hydrogen plant of about the same capacity will go on stream in November at Newark, N. J. The gas is distributed in cylinders and tube trailers to users, including metal heat treaters.

Beck Buys Whitman Firm

Whitman Foundry Inc., Whitman, Mass., subsidiary of Elliott Addressing Machine Co., has been sold to Alexander Beck who has been president since June. Equipment includes a 15 ton cupola and four, 60 lb, crucible furnaces. The foundry makes gray iron and semi-steel castings.

Armco Enlarges Facilities

Armco Steel Corp., Middletown, Ohio, will enlarge the storage areas and handling facilities for iron ore, taconite pellets, ingots, and scrap at its Ashland (Ky.) Works. The oreyard will be widened to provide storage space for a total of 1,050,000 tons of ore and pellets. A second and larger ore bridge ($3,450,000) will be completed next spring. About $500,000 will be expended to provide more storage space for scrap and ingots.

Plans Australian Plant

James B. Clow & Sons Inc., Chicago, and General Industries Ltd. of Australia have launched a joint venture, the construction of a $3 million cast iron pressure pipe plant in Melbourne, Australia. Ownership in a new company, Metters-Clow Pty. Ltd., will be equal. General Industries makes cast iron soil pipe, plumbing fixtures, gas and electric ranges, and radio and television sets.

J&L Installs Equipment

Jones & Laughlin Steel Corp., Pittsburgh, has installed new quality control equipment at its Blair Limestone Div., Martinsburg, W. Va. A Leco induction furnace aids in the determination of sulfur in burned lime used in open hearth and basic oxygen steelmaking furnaces. The induction furnace was manufactured by Laboratory Equipment Corp., St. Joseph, Mo. Other features of the new equipment include an oxygen purifying train, an automatic timing device, and a titrator which automatically indicates the amounts of sulfur present.

Du Pont Improves Plant

E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., plans a major expansion and modernization of its sulfuric acid plant at Wurtland, Ky. The company also plans to establish a bulk acid terminal near New Cumberland, W. Va.

Ups Can Machinery Output

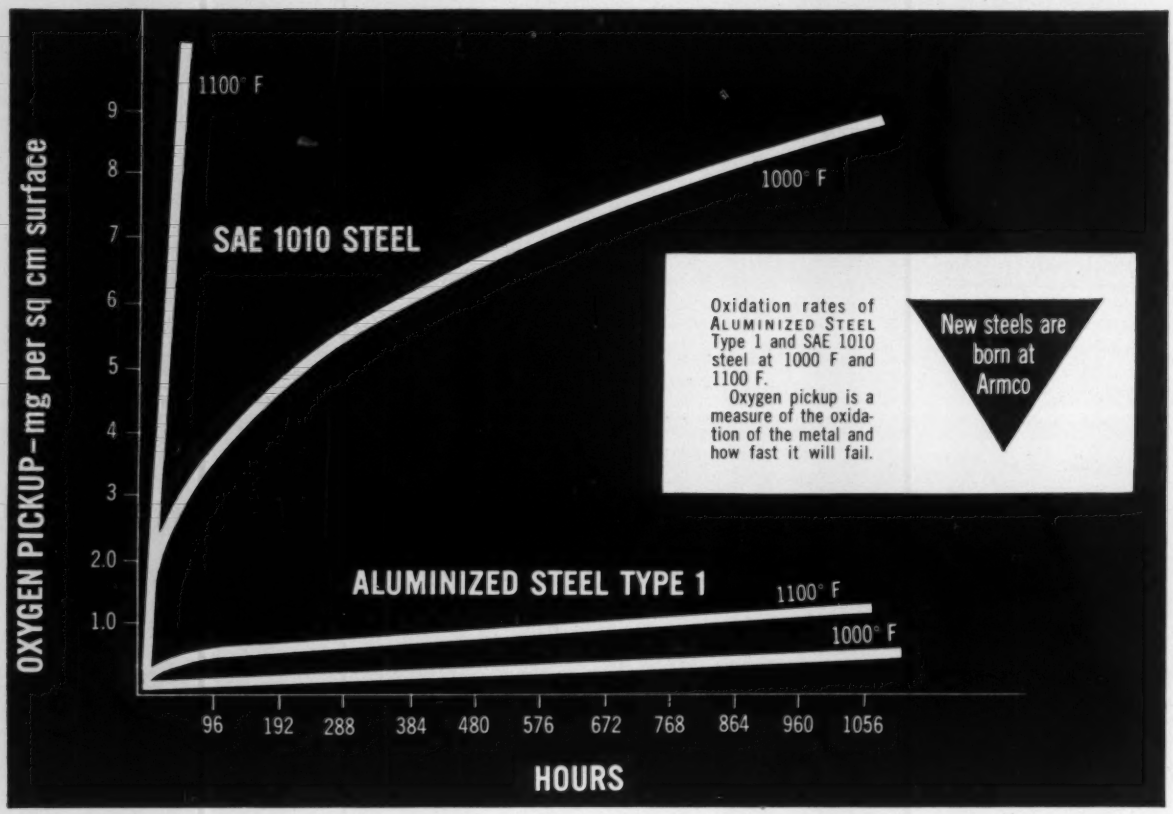
Baldwin - Lima - Hamilton Corp., Philadelphia, has speeded manufacture of its canmaking machinery by integrating machining and assembly operations into one, self-contained shop now in operation at its Industrial Equipment Div., Eddystone, Pa. This division is replacing three former B-L-H divisions: Hamilton, Loewy-Hydropress, and Eddystone.

Air Reduction Expands

Air Reduction Pacific Co., San Francisco, a division of Air Reduction Co. Inc., has launched a $1 million expansion of its new air separation plant at Richmond, Calif. The project will boost the rated capacity of the plant to more than 65 tons a day of high purity, liquid oxygen, nitrogen, and argon. The original plant, opened in March, 1960, will be expanded to

(*Please turn to Page* 135)

WHY AND WHERE ARMCO COST-CUTTING RESISTANCE



These oxidation rate curves show one important reason why Armco ALUMINIZED STEEL Type 1 is so useful for parts that must resist heat. Its hot-dip aluminum coating, applied by a special Armco process, prevents oxygen from scaling the metal at temperatures to about 1250 F.

This union of steel and aluminum also gives you other key advantages that mean better products and lower costs.

High heat reflectivity—at temperatures to 900 F ALUMINIZED STEEL reflects about 80% of incident radiant heat.

Resistance to corrosion—The special aluminum coating withstands the attack of combustion products and condensates as well as heat.

High strength—The steel base of ALUMINIZED STEEL provides design-simplifying, cost-cutting strength and rigidity in service at temperatures as high as 1250 F.

Low Cost—For only a few cents a pound more than cold-rolled steel, you get a two-in-one metal of proved economy for parts that must resist both heat and corrosion.

This versatile aluminum-coated steel provides advantages offered by no other metal. Design its ability to resist heat and corrosion, its heat reflectivity, its strength and economy into **your** products. Write us or mail the coupon for complete information on the properties, fabrication and use of Armco ALUMINIZED STEEL Type 1.

ARMCO STEEL CORPORATION
2440 Curtis St., Middletown, Ohio

Send me complete information on Armco ALUMINIZED STEEL Type 1 for the following applications:_____

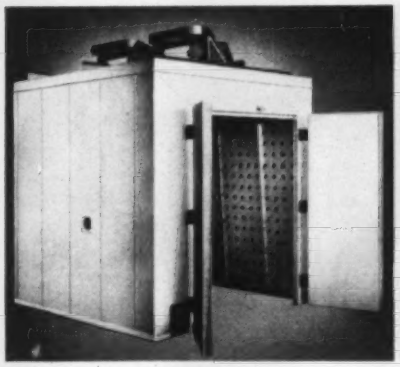
NAME_____ TITLE_____

FIRM_____

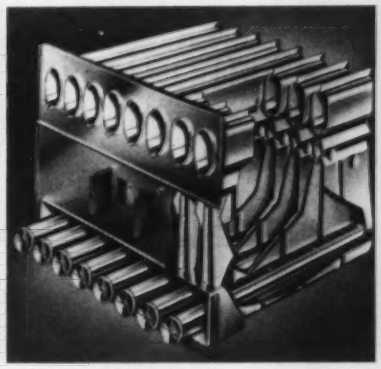
STREET_____

CITY_____ ZONE____ STATE_____

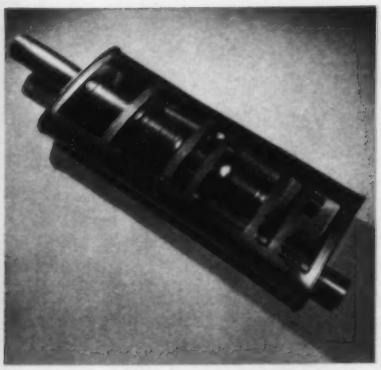
ALUMINIZED STEEL TYPE 1 ASSURES TO HEAT AND CORROSION



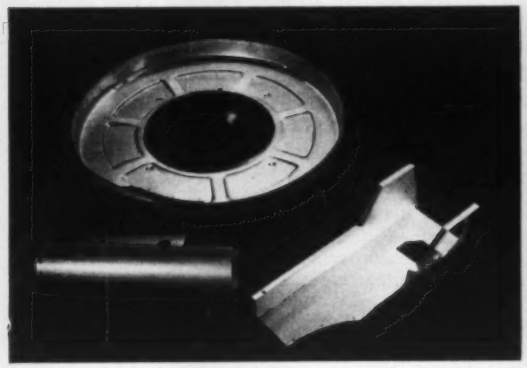
Industrial oven



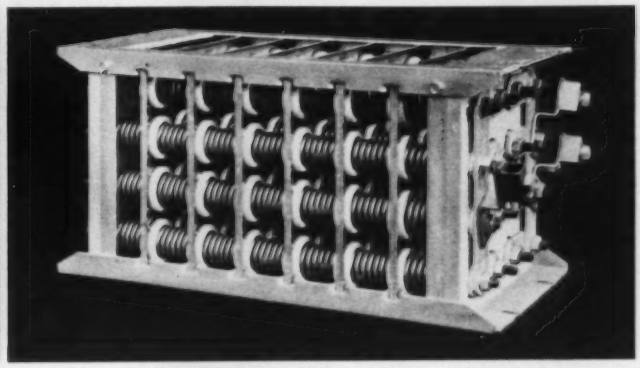
Heat exchanger



Automobile muffler



Laundry drier elements



Electric resistor

The unique combination of properties possessed by ALUMINIZED STEEL Type 1 makes it an effective material in a wide range of applications. For example, manufacturers of appliances such as electric toasters and laundry driers, industrial ovens, and restaurant equipment, use it primarily for its heat reflectivity and corrosion resistance.

In automobile and truck mufflers, the excellent resistance of ALUMINIZED STEEL Type 1 to the combination of heat and corrosion results in greatly extended service life. Use of this metal for the mufflers of many makes of cars is sound proof of its durability and economy.

The ability of ALUMINIZED STEEL to resist oxidation at temperatures to about 1250 F, and to ward off corrosion by condensates and combustion products, has enabled producers of gas and oil fired heaters to achieve greater efficiency and durability at low cost.

For industrial and consumer electric heaters, high heat reflectivity combined with the corrosion resistance and structural strength of this special Armco Steel has meant manufacturing economies plus reliable service.

In addition to these typical applications, Armco ALUMINIZED STEEL Type 1 is specified for many other commercial, industrial and consumer products because it yields new sales advantages and greater durability at lower cost.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

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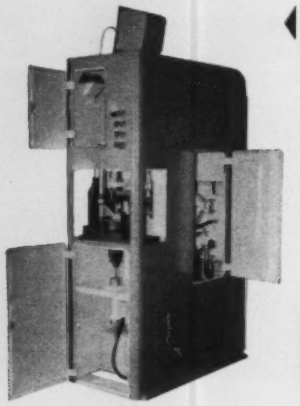
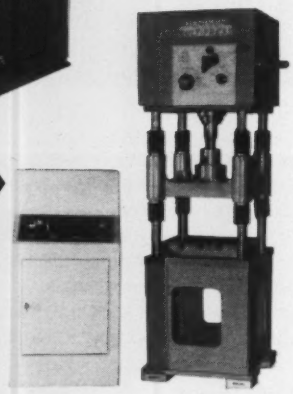
DENISON HydrOILics

Look at the new and exclusive features DENISON brings you in these two...

NEW PRESSES



MULTI-COMPACTION PRESS *shown with access doors open. Tooling setup shown is for production of tantalum capacitor anodes. Reel of tantalum wire (seen in upper compartment) is straightened, cut to exact length and fed vertically into the press. Powdered tantalum is automatically fed from overhead hopper into compaction die cavity.*



SERVO-DRIVEN MULTIPRESS "600" *with movable console which contains operating controls. Note rugged platen and large daylight area. Control lever on upper panel adjusts ram stroke for ¼", ½", ¾", 1", 1½", 2" and 3" work strokes. Feed mechanism is automatically adjusted when operating speed is varied.*

TWO NEW PRESSES fill the long-standing need for a high speed hydraulic progressive stamping press and a productive, dependable powdered materials compaction press. Here are some of the key features of these advanced new units:

High Speed Servo-driven Multipress "600"

- 600 strokes per minute with 25-ton capacity.
- Strokes per minute and ram pressures are adjustable while press is operating.
- Simple lever adjustment of ram stroke length. Cams can be easily changed for special work strokes.
- Harmonic cam drive automatically sequences the feed mechanism for perfect cycling with ram operation.
- Punch breakthrough is adjustable . . . does not rely on mechanical stops.
- Press frame and power unit are shock-mounted . . . resulting in minimum operating noise level.

Multi-Compaction Press

- Designed for volume production of ferrous, non-ferrous and exotic metals . . . glass and plastics.
- Fully automatic, unattended operation.
- Enclosed tooling area eliminates spillage and loss of material.
- Single or automatic cycle operation . . . all-hydraulic control.
- Self-contained, overhead stainless steel hopper feed.

Your nearby Denison hydraulic press specialist can show you how the new Multipress "600" and the Multi-Compaction press can help make your products better for less. Call, write or wire for details.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
1180 Dublin Road • Columbus 16, Ohio

These two new presses will be demonstrated at the Machine Tool Exposition in Chicago, September 6-16.

MODERN MACHINE TOOLS MMT-PE PRODUCTION EFFICIENCY

1960 Machine Tool Exposition
Denison Booth 914

DENISON
HYDRAULIC MULTIPRESS

(*Concluded from Page* 131)

increase production by 20 per cent to 33 tons a day and a second unit will produce 32 tons a day. The new construction is scheduled for completion early in 1961.

Fairbanks Enlarges Plant

Fairbanks Co., New York, will build a $100,000 addition to the iron foundry building at its Binghamton, N. Y., valve plant. The 20,000 sq ft of new space will house iron ore and cleaning rooms and provide storage space for patterns. Space currently used for coremaking and cleaning will be converted to iron machining operations.

Rolled Steel Opens Lab

Rolled Steel Corp., Skokie, Ill., and Houston, has established a quality control laboratory. It enables the firm to make hardness and drawing tests ranging from 100 to 30,000 lb on steel varying in hardness through the complete B scales and including the entire 45-T scales in all gages. Donald E. Bushnell is quality control manager.

Wyandotte Improves Plant

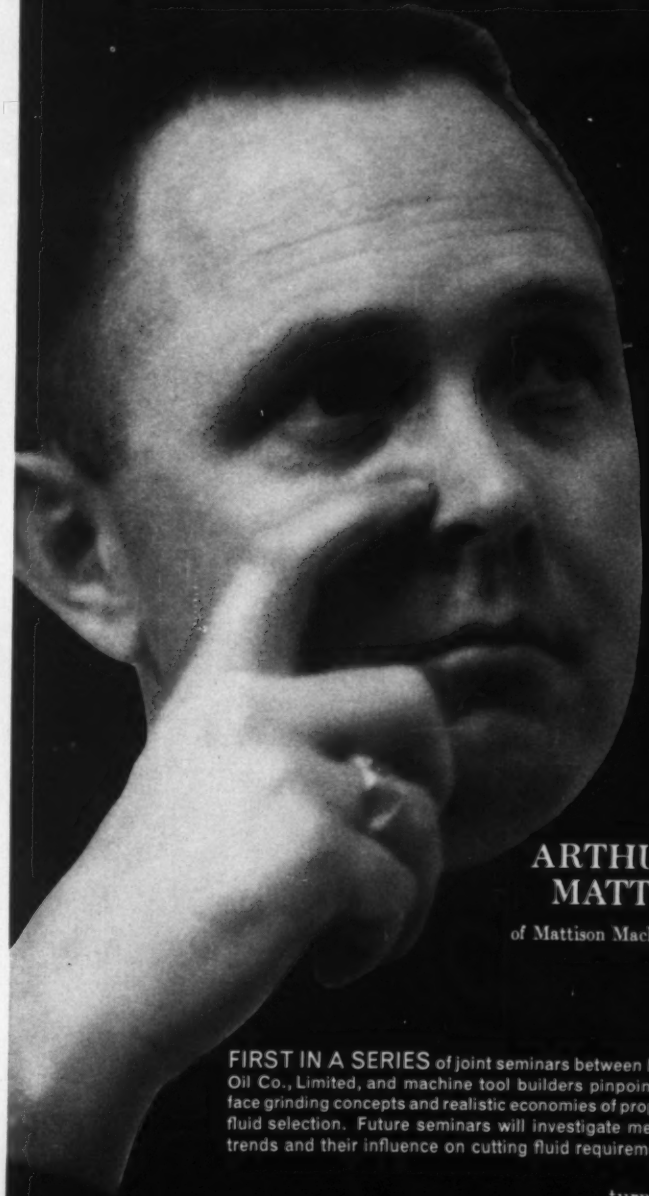
Wyandotte Chemicals Corp., Wyandotte, Mich., is proceeding with major improvements in its limestone calcining facilities at that city. Changes in the burning process are expected to improve the quality and increase the available capacity. Upon completion of the program, the firm will have an annual production capacity of 1.5 million tons of high grade lime. The first unit is scheduled to be in operation by the beginning of 1961.

Plans Special Metal Unit

Calumet & Hecla Inc., Chicago, will build a $1.6 million facility at Inkster, Mich., for fabricating special metals. Zirconium and titanium are the first metals scheduled for production at the new plant. The company has been making products of those and such other special metals as tantalum, columbium, vanadium, molybdenum, beryllium, and chromium in a laboratory pilot plant for five years. Initially, the new

(*Please turn to Page* 139)

HARD WHEEL THINKERS IN SURFACE GRINDING



ARTHUR M. MATTISON
of Mattison Machine Works

FIRST IN A SERIES of joint seminars between D. A. Stuart Oil Co., Limited, and machine tool builders pinpoints new surface grinding concepts and realistic economies of proper grinding fluid selection. Future seminars will investigate metal working trends and their influence on cutting fluid requirements.

turn the page

MATTISON pushes the process

Down in the shop . . . have you put an ear to the "shwwish" of sharp new grits cutting stock after the dull ones broke loose . . . then cursed the rumble and groan of the grinder when only minutes later the wheel loaded up? Time was when these real sounds too often meant premature wheel wear or lack of detergency in the grinding fluid. Older wheels simply couldn't make the heavy cuts, and the "witchcraft" of choosing cutting fluids baffled the experts. But now, wheel improvements and proper grinding fluid selection can make the big *shwwish* a steady sound of profitable stock removal on machines like Mattison's new No. 60.

power, pressure, AND porosity FOR profitable surface grinding

Grinding giants and cutting fluids are seminared by Mattison representatives, Stuart Division Manager George G. Spehn (kneeling), and Stuart Engineer Ronald J. Foitl (second from right).

Russel Holm, sales engineer—bear down on wheels and ease up on costs.

Mattison Machine Works, Rockford builder of surface grinders, is pushing horsepower hard. Objective: to advance surface grinding for heavy stock removal, as well as for accurate finishing. Up to 125 hp is applied to 20″ wheels. High downfeed increases grain penetration and keeps wheels self-dressing. Results show high machine efficiency and low unit cost for pieceparts properly designed for the "Mattison concept."

William C. Knapp, sales manager—pulling the belt *into* the work produces a finer finish.

Grinding wheels are really throwaways

As Arthur M. Mattison, chief engineer, points out: "Aluminum oxide wheels are a neat package of hard, self-sharpening tool bits in throwaway form. Their ability to stay sharp, even under extremely heavy cuts, eliminates a major cause of machine downtime. And, hard materials present no tool breakage problem."

Today's hard wheels are right for the "Mattison concept." Vitrified bonds are so improved that now you get economical breakdown rates under extremely heavy loads. Not only that, grits are available in individually formed crystals (instead of pulverized particles). They fracture several times as they get dull instead of pulling out whole. Thus, wheels offer a greater number of sharp cutting edges which use new spindle power to penetrate deeply into most materials, without burning.

Chip clearance still a problem

Yet to be solved is the chip clearance problem. There isn't enough space between grits. With heavy stock removal, chips tend to fill the voids in the wheel. Ratio of stock removal to wheel cost drops drastically as a result.

How grinding fluids help

Here's where cutting fluids enter decisively into the economics of grinding. Proper balance of lubricity and detergency improves efficiency, wheel life, and surface finish. The right amount of lubricity, such as in Stuart's Hi-D 106, produces full benefits from new abrasive grains which fracture and produce new cutting edges. Total lack of lubricity results in dulling and pulling out of the cutting edges before full value is received.

Heavy stock removal demands a grinding fluid with high detergency and surface wetting ability. Limited chip clearance demands active flushing so chips do not clog voids and cause loading.

Proper application is important

The importance of directing a heavy volume of fluid to the point of contact bears continued attention.

Arthur M. Mattison, chief engineer (left)—we lose flatness if the grinding fluid dries on the chuck.

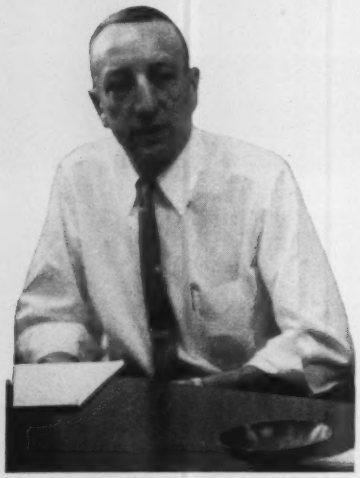
A case in point, cited by Mattison engineer, Russel Holm, is a difficult disc-grinding job—removing 5 cubic inches per minute from 1045 carbon steel saw guides. After holes were provided in the wheel to improve the flow of grinding fluid, it was possible to use a grade 4½ times harder and boost stock removal. With cylinder wheels, the answer often is to pipe fluid through the center, or up *through* the work.

more next page →

William C. Knapp—some plants prefer to use solubles because of cost, but their finishes could be better.

Variation in water prevents universal grinding fluid

With varying water conditions, it is not easy to formulate the "perfect grinding fluid." A fluid that leaves accuracy destroying deposits in the Midwest easily could produce foaming in the East. Rusting and lack of stability usually can be traced to specific water conditions. As a result, variations in formulation often are required to compensate for water. Generally, it pays to lean toward high detergency when grinding large, uninterrupted surfaces for which a free cutting wheel is most important.



Linsly Brown, sales engineer—light oil is superior for abrasive belts on aluminum—water tends to drag.

Abrasive belt grinding goes precision

Nowhere in grinding is there so much technical change as in the abrasive belt field. Mattison engineer, Linsly Brown, lives in a ground swell of new applications—and the high horsepower concept (they're using up to 150) is an important part of Mattison's thinking on every job.

Yes, power and rigidity are required to get positive grain penetration at belt speeds as high as 12,000 ft per minute, holding thickness tolerances of ±.001".

Linsly Brown (left)—steel companies are using ThredKut 99 to produce #4 finish on stainless.

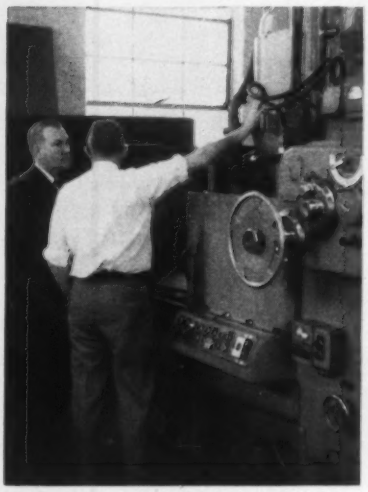
Selection of grinding and polishing oils for abrasive belts

Selection of grinding fluids gets all knotted up in belt costs, finish requirements, material specifications, and methods of application. Most of the grinding cost is in the belts, and "wet" belts cost more than the "dry" paper type. So it is more economical to use oil-type grinding fluids than water-mix types—and in most cases, they produce better finishes.

Straight oils usually work best with aluminum and stainless because bright, shiny finishes are required. For stainless sheet polishing, a sulpho-chlorinated oil, such as Stuart's ThredKut 99, has proved its superiority. For aluminum, a light viscosity oil with fatty lubricity additive, such as SuperKool 201M, produces best over-all results.

Methods available for application often make viscosity a selection factor. Generally, a heavy flow of oil is preferred. But, many jobs are performed successfully with spray lubrication or oil brushed on the work surface.

(For more information or reprints of this seminar, write to our Technical Service Department, located at the address below.)



Mattison rotary—the new 125-hp Quick-Tilt machine increases production 50%, or more. Cutting fluid must clean the wheel.

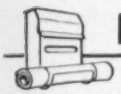
Productive Stuart Lubrication SEMINAR

D. A. STUART OIL CO., LIMITED

2727 South Troy Street, Chicago 23, Ill. • Canadian D. A. Stuart Oil Co., Limited, P. O. Box 430, 43 Upton Road, Scarborough, Ontario, Canada

(*Concluded from Page* 135)

plant will produce tubes up to 2.25 in. OD and rods up to 2 in. OD. Full scale production is expected to get underway by Jan. 1, 1961. The firm's Wolverine Tube Div., Allen Park, Mich., will operate the new production facility.



NEW ADDRESSES

Hartman Metal Fabricators Inc. moved from Rochester, N. Y., to larger quarters on W. Main Street, Waterloo, N. Y. Hartman makes storage racks, power dock levelers, portable lift trucks, and special material handling equipment.

Western-Knapp Engineering Co., San Francisco, moved its Chicago office to larger quarters at 205 W. Monroe. R. K. Young is central district manager; A. Harris Barber, business development manager.

Socket Screw Div. of Bristol Co., Waterbury, Conn., moved its Chicago district office and warehouse to 2040 N. Hawthorne Ave., Melrose Park, Ill. W. C. VanLeuven is the socket screw sales manager.

Toledo Pickling Steel Service Inc. moved to its new plant at 135 Fearing Blvd., Toledo, Ohio. The $450,000 facility contains 35,000 sq ft of space. The firm operates a steel sheet and strip service center.

Rust Engineering Co., Pittsburgh, moved its New York office to Room 1910, 9 Rockefeller Plaza, New York 20, N. Y.

Ipsen Industries Inc. moved its general office to Wheeler Road, Cherry Valley, Ill.

Union Carbide Metals Co., a division of Union Carbide Corp., moved its sales promotion department to Union Carbide Bldg., 270 Park Ave., New York 17, N. Y.

Fuller Co., Catasauqua, Pa., subsidiary of General American Transportation Co., moved its Los Angeles sales office to its plant at 2966 E. Victoria St., Compton, Calif. Fuller maintains light metal fabrication facilities and a stock of re-

(*Please turn to Page* 142)

TODAY AND TOMORROW

whatever may be your problems

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Cast Bronze Alloys...Powdered Sintered Metals...Bearing Aluminum Alloys

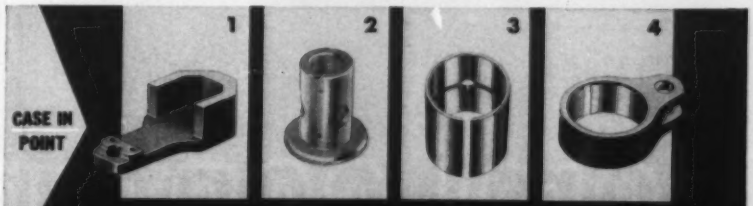
Why pay more for a bearing or part than you have to? Let Bunting help you get your requirements down on the lowest cost level compatible with adequate performance.

Today and tomorrow "the best" bearing means one that will do the job at the lowest possible cost. Let Bunting help you find the best bearing.

Bunting offers a highly competent designing, engineering and manufacturing facility operating in the field of bearings and special parts.

All modern proven materials are available, others are under study. Two plants with advanced equipment—of our own design—assure absolute production control and lowest manufacturing cost.

Let us re-examine your current bearing applications, or work with you on new requirements. Send in your prints for study and pricing. No cost or obligation.



1 The great and diverse cost advantages of powder metallurgy are revealed in the highly complex nature of this bearing support plate for power tools made in Bunting's Powdered Sintered Metals Plant.

2 An Aluminum Alloy helped cut the cost of this high speed turbo super charger bearing with its intricate machining of many dimensions and close tolerances.

3 Bunting exclusive methods and equipment reduced to the minimum the cost of this cast bronze spindle bearing with its extremely rigid specifications.

4 This connecting rod demands a fine profilometer reading on the finish of the bores in the two holes, axes of which must be parallel to each other within extremely close limits. Bunting makes such high precision work feasible cost-wise.

MACHINING SERVICE: Emergency service machine shops in Bunting Branches are there to render immediate low cost service on bearings or parts needed for experiment or maintenance. Your local Bunting Distributor can arrange for such service.

Write for these:

No. 1...ENGINEERING HANDBOOK OF POWDER METALLURGY—A comprehensive technical treatment of engineering and manufacturing of sintered metals, bearings and parts.

No. 46—TECHNOLOGY OF BUNTING BEARING ALUMINUM—A technical treatise on the composition and machining of Bearing Aluminum Bar Stock.

No. 158—GENERAL CATALOG—Complete listings of Cast Bronze and Sintered Bronze Stock Bearings and Bars and Bunting Bearing Aluminum Bars available from stocks of local distributors all over America.

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WHEEL TRUEING TOOL COMPANY

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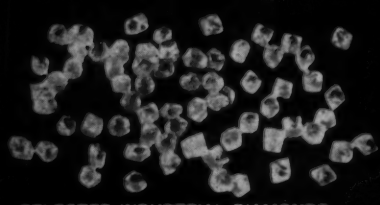
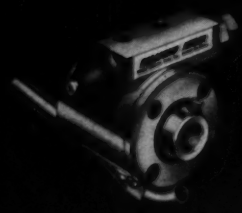
DIAMOND TOOLS
DIAMOND RESEARCH AND TECHNOLOGY

STANDARD DIAMOND DRESSING TOOLS



SELECTED INDUSTRIAL DIAMONDS



DIAMOND-MISER DIAMOND TOOL TURNING DEVICES

marks a

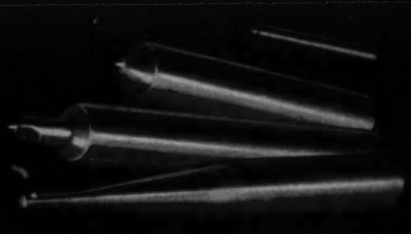
semi-centennial

and says
"THANK YOU
AMERICAN
INDUSTRY"

TRU-GRIT DIAMOND DRESSING TOOLS

CLUSTER DIAMOND DRESSING TOOLS

WHEEL TYPE DIAMOND DRESSING TOOLS



RADIUS FORMING DIAMOND TOOLS

TRU-LINE BLADE TYPE DIAMOND DRESSING TOOLS

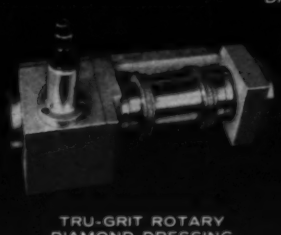
MINING AND OIL FIELD DIAMOND BITS

TRUCO DIAMOND MASONRY DRILLS

CHISEL TYPE DIAMOND DRESSING TOOLS

DIAMOND IMPREGNATED DRESSING TOOLS

DIAMOND TURNING AND BORING TOOLS



TRU-GRIT ROTARY DIAMOND DRESSING WHEELS

TRUCO MASONRY DRILLING EQUIPMENT

Practically every diamond tool in use today owes something to the fact that fifty years ago, some foresighted men started one of America's first diamond tool plants in a little home garage in Highland Park, Michigan.

The diamond tool of those days was a primitive thing—a diamond in a metal shank stuck into a handle. Performance was unpredictable; wastage and diamond loss great.

But, these men had come up through the abrasive wheel business and were convinced that, since abrasive wheels differed so much —in size, bond, type and size of grain, hardness, etc., it was only logical that diamond dressing tools should be different, too; in fact, the ideal tool would be *engineered to match the specific wheel and its work.*

They even believed that such tools could be *guaranteed* to do their intended job.

It was a radical idea for those days; it meant endless research on factory production lines and in laboratories but, it worked. A steady progression of new ideas in diamond tools, new concepts of application and performance flowed from the garage workshop and from the plants that succeeded it, changed diamond-using habits and established an American diamond industry that is unsurpassed throughout the world.

This, we think, is an appropriate time to say "thank you" to our loyal customers and to the members of our company "family" who have made this growth possible and who, together, have brought us to our semi-centennial year.

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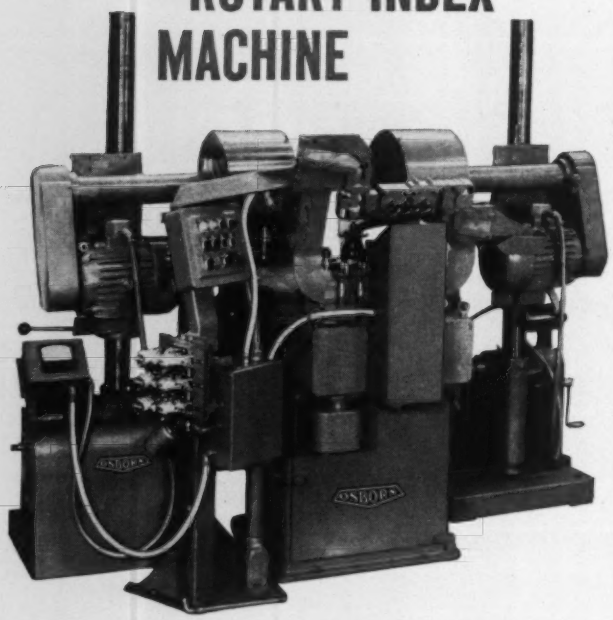

features "building block" components arranged for completely automatic finishing cycles

An automatic part load/unload and turnover mechanism is the latest addition to Osborn's Rotary Index metal finishing units. This feature eliminates the need for production machine operators—and means regulated work flow plus higher production rates.

Most significant feature is the use of a *standard* index table and *standard* finishing heads easily tailored for efficient, economical *automated finishing* operations.

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PRODUCTION ENGINEERING SHOW SEPT. 6-15 1960 NAVY PIER, CHICAGO

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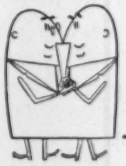
Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

(*Concluded from Page* 139)

pair parts for its pneumatic handling and component equipment. A complete line of products of Sutorbilt Corp., a subsidiary of Fuller, is also made at the plant. L. G. Dougherty is Los Angeles district manager.



CONSOLIDATIONS

Joy Mfg. Co., Pittsburgh, purchased **Compton Inc.**, Clarksburg, W. Va., manufacturer of earth and coal augurs.

Taylor Fibre Co., Norristown, Pa., manufacturer of laminated plastics and vulcanized fiber, is acquiring **Dytronics Inc.**, Rochester, Mich., maker of die stamped circuits for electrical and electronic applications.

Universal Match Co., St. Louis, is acquiring Glasco Corp., producer of vending machines, glass fiber items, and food service equipment.

Greenleaf Corp., Pittsburgh, acquired **Triangle Industries Inc.**, Saegertown, Pa., manufacturer of specialty tools, gages, and other machine tool items. C. W. Brant will continue as general manager of the Saegertown plant.

NEW PLANTS

Radio Corp. of America, New York, is building a $4 million plant at Palm Beach Gardens, Fla., to make electronic computer systems. The facility will supplement office, engineering, and manufacturing operations at the firm's computer headquarters in Camden, N. J.

Metallurgical Consultants Inc. will erect a 12,000 sq ft plant and office building in Montebello, Calif. The firm specializes in furnace brazing and metal processing.

Renold Chain Mfg. Ltd. is constructing a plant at Brantford, Ont., for the manufacture of chain sprockets for power transmission and agricultural equipment. The firm is a subsidiary of Renold Chain (England) Ltd.

Stop looking for spring wire in large coils...it's here (*courtesy of Roebling*)

This is really an enormous availability – 3000 pounds of high carbon spring wire in a single, nonstop coil. You know what this means. Uninterrupted productivity. You make more of your products faster and, as with *any* length of Roebling spring wire, you make them better.

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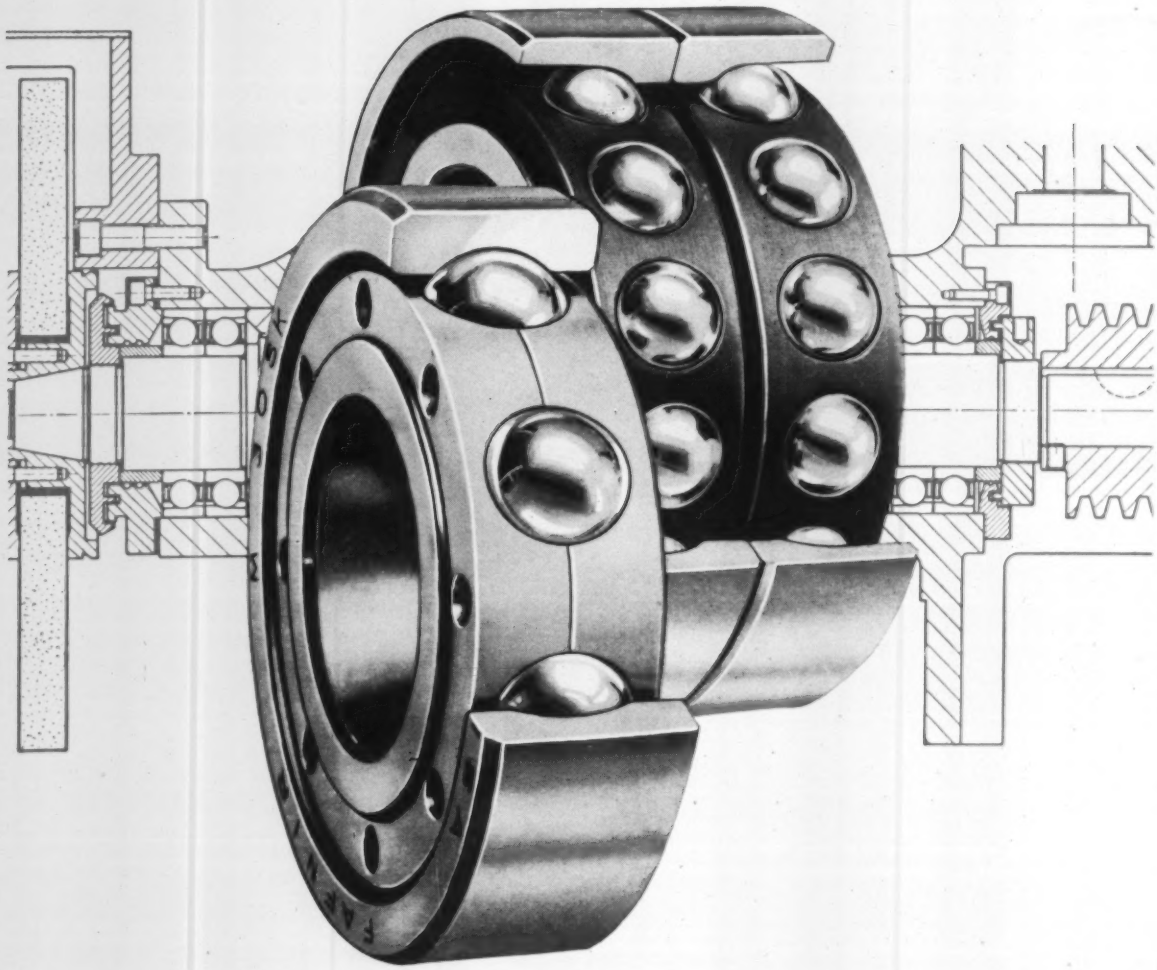

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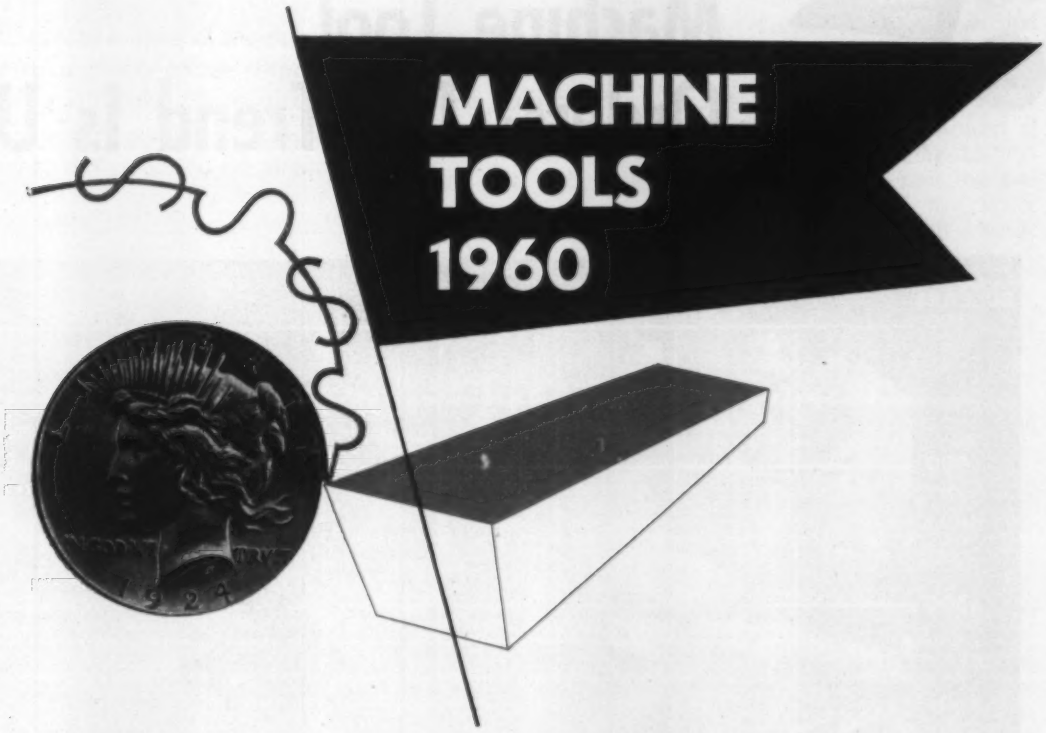

New Equipment Will Help You Trim Production Costs

NEXT WEEK, metalworking's attention will be focused on Chicago, the site of the country's largest trio of industrial shows:

The Machine Tool Exposition—1960 (Sept. 6 to 16) at the International Amphitheatre.

The 1960 Production Engineering Show (Sept. 6 to 16) at Navy Pier.

The 2nd Coliseum Machinery Show (Sept. 7 to 15) at the Coliseum.

The shows (which are held every five years) have special significance for every metalworking manager because builders will introduce a new generation of machine tools.

This special show section of STEEL. . .

- Points out more than 120 significant developments that will be shown so you can interpret their importance.
- Shows you more than 70 of the machines that will make their debuts in Chicago.
- Tells you who will exhibit and where you can find them at the shows.
- Evaluates the buying climate for machines tools in the second half and the prospects for the capital equipment industry through 1980.

For those who go to Chicago, and for those who don't, this section is an introduction to the machine tools of the sixties.

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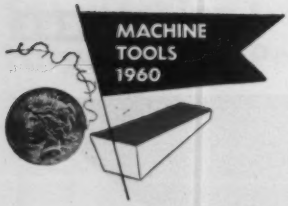
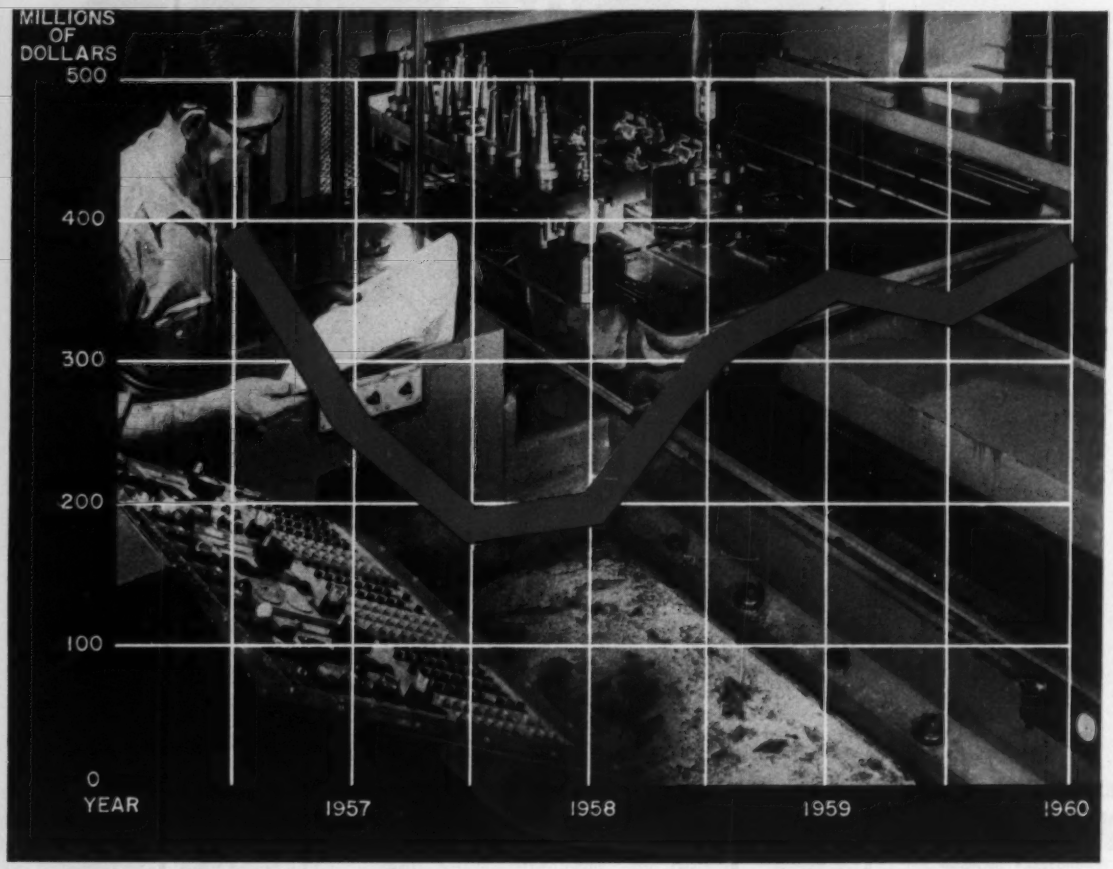


Machine Tool Orders: The Trend Is Up

(Net new orders for metal cutting and metal forming types)



LOOK FOR metalworking companies to order $384 million worth of machine tools during the second half of this year—$48 million more than during the first half. Most of the orders will be placed after users examine the new machines to be exhibited in Chicago Sept. 6-16.

That's what STEEL learned from two surveys. The companies that purchase about one-third of all capital equipment bought by the metalworking industries told STEEL, confidentially, their ordering plans for the second half of this year (STEEL, July 11, p. 45). STEEL also asked 64 leading machine tool builders for their business outlook.

The buyers say they'll order 16 per cent more machine tools, 11 per cent more presses and press brakes during the second half than in the first six months of this year. STEEL then asked the buyers—and the group of builders—for a breakdown by type of machine.

The results are reported in the table on Page 147.

• **What It Means**—The ordering uptrend augurs well for national prosperity. Machine tool orders are a sensitive barometer of the business trend.

The order surge also points up metalworking's vigorous drive for lower manufacturing costs through sound investment in more efficient production equipment. Faced with two vicious profit killers—price cutting and foreign competition—metalworking is forced to lower costs or watch profits dwindle to micro-margins.

Still, many companies have yet to take advantage of the profitability that efficient, new equipment offers. A STEEL survey finds that

Two STEEL surveys—one of machine tool buyers, one of builders—point to a rising order trend in the second half. Most of the buying will take place after The Machine Tool Exposition—1960, which opens in Chicago next week. Look for prices to rise, deliveries to be stretched out

How 2nd Half Orders Will Compare With 1st Half Pace, by Types

	% INCREASE
Boring, drilling, tapping & threading machines	9
Broaching machines	19
Gear cutting & finishing machines	10
Grinding, honing & lapping machines	20
Lathes, including automatic turning machines	8
Milling machines	7
Polishing & buffing machines	25
Planers, shapers & slotters	10
Sawing, cutoff & filing machines	5
Special machines	9
Press brakes	6
Forging presses	5
Forming presses	9
Extruding presses	10
Other forming machines	11

metalworking needs $20.7 billion worth of new equipment to get its plants in tune with today's competitive tones. But the industry plans to order only $4.7 billion worth of new equipment this year. It's left with a $16 billion challenge—to achieve a degree of efficiency that will counter the tide of imports, stem inflation's rise, and bring profit margins back to the point where investors will adopt the industry as one offering a fit return.

Probably the biggest deterrent to equipment replacement is the federal government's outmoded depreciation system. Reform would permit industry to invest more dollars earlier in efficient equipment. The government is now studying the problem. The Treasury Department has mailed questionnaires, seeking the views of 6000 industrialists on depreciation reform. The department hopes to get enough returns by Sept. 1 to have them computed on its Univac by the first of the year. It's your chance to sound off on the serious problem. STEEL has been crusading for reform since 1953.

If reasonable reform is achieved, machine tool orders could jump back toward the levels of 1956 and 1957. They're now headed in that direction.

● **Who's Buying**—The auto and aircraft industries and producers of primary metals are leading the buying upturn. Here's how the machine tool buying of five major metalworking groups will change in the second half vs. the first:

Primary metals	28% More
Fabricated metal products	4% More
Machinery, except electrical	5% Less
Electrical machinery	3% Less
Transportation equipment	24% More

Here's the pattern for presses and press brakes:

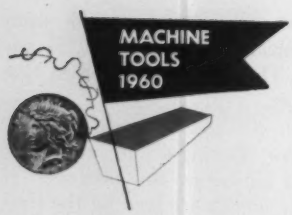
Primary metals	4% Less
Fabricated metal products	19% More
Machinery, except electrical	13% More
Electrical equipment	4% More
Transportation equipment	7% More

● **The Price You'll Pay**—Small, in some cases microscopic, profit margins in the industry are forcing builders to firm up their quotations. Look for many builders to increase prices 10 per cent in the coming months; some have already made the move. The timing for many will be next week—when The Machine Tool Exposition—1960 begins. In most cases, the jumps are selective—builders are holding the line on machines where profit margins are reasonable.

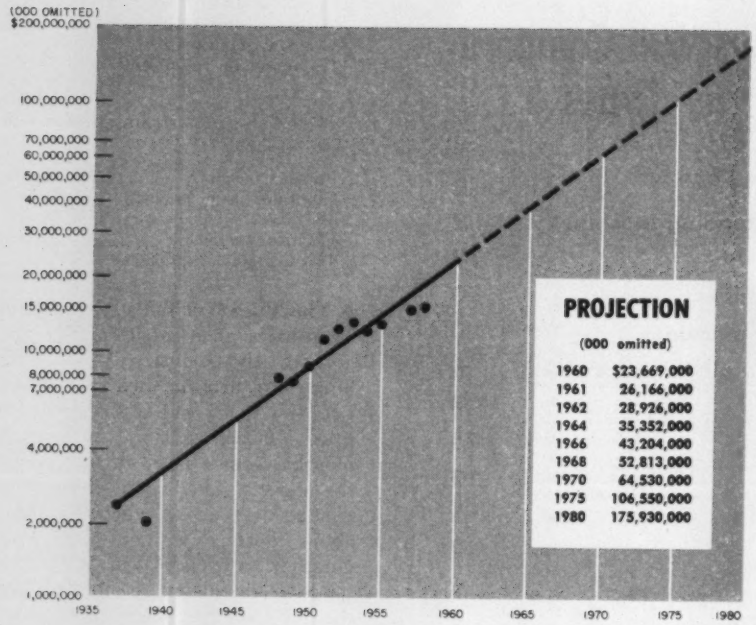
They're also holding the line on some machines where the margin is small or nonexistent. Reason: To compete with foreign machines—which are being offered in more places, in more models, by more distributors across the nation.

● **Delivery Status**—You can expect somewhat slower deliveries after the machine tool show. Reason: Buyers expect—and STEEL's survey confirms—that orders will pick up. True, the machine tool industry has considerable excess capacity. But it has pared its skilled labor force. If the builders get the influx of orders during the last quarter that they're hoping for, they'll be forced to add more skilled men—and that takes time (one builder estimates six months).

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

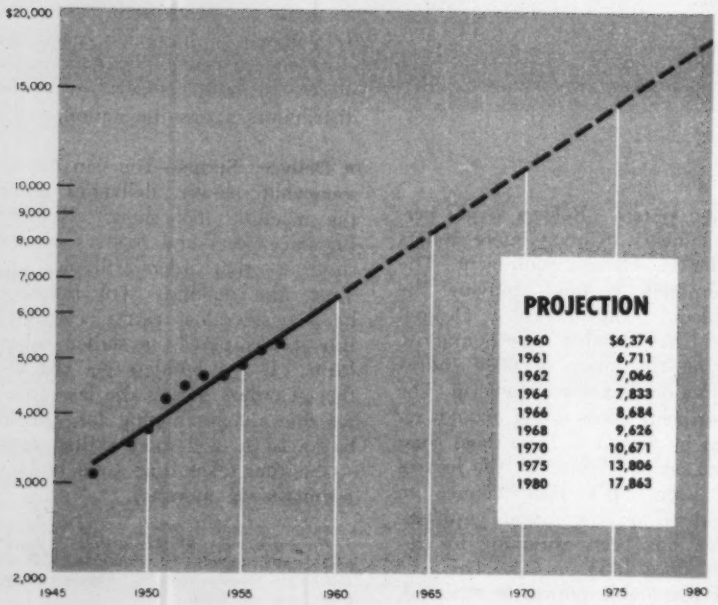


Nonelectrical Machinery to Hum in Next Two Decades



Value Added by Manufacture to Reach $176 Billion by 1980

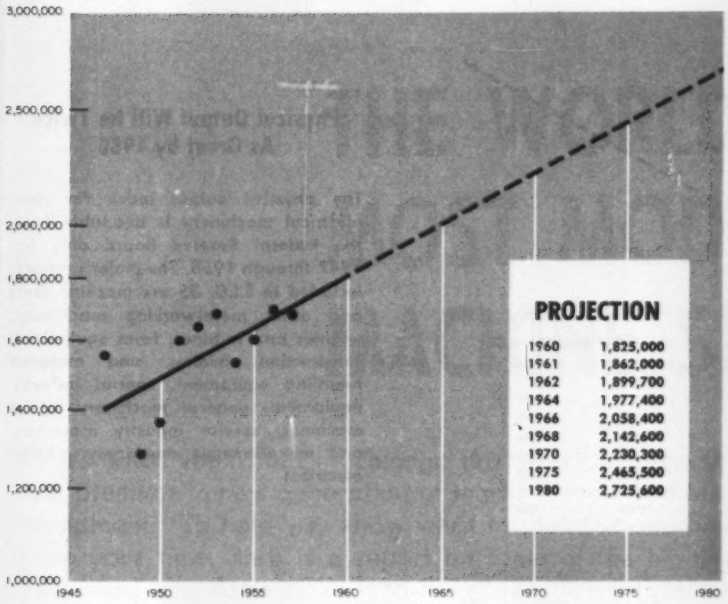
This chart shows the value added for each census year from 1937 through 1957. The dots in this and succeeding charts indicate the actual figure for each survey year. The line is the trend. Dots are missing for World War II years because surveys were discontinued then for security reasons. Dollar figures in this and other graphs are unadjusted, and the projections include estimates for inflation.



All Employees' Average Annual Earnings Will Nearly Triple

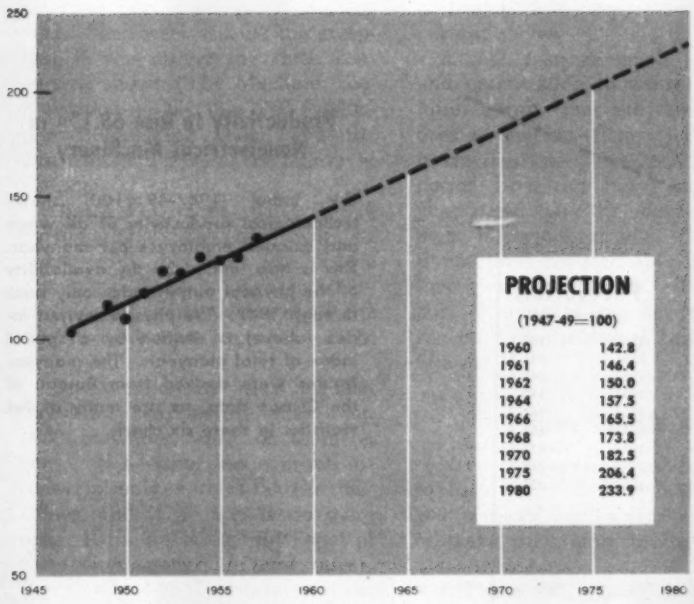
This chart is derived from corresponding census data for total wage and salary compensation and the total number of employees. Economic productivity, or the yearly ratio of value added by manufacture (above) to total earnings in nonelectrical machinery, has been nearly constant at the $1.69 average for 1947 through 1957. This illustrates the Rucker Share of Production Principle. It shows that the employee's share of production for nonelectrical machinery, taken as a whole, is 59.02 per cent of the values created and that the company's share averages 40.98 per cent.

Value added by manufacture in machine tools and other nonelectrical machinery will be more than seven times greater in 1980 than it is this year. Employment will jump from 1.8 million now to 2.7 million. Physical output will double, and productivity will improve by more than two-thirds. Those are some of the probabilities projected for Standard Industrial Classification 35 by Eddy-Rucker-Nickels Co., Cambridge 38, Mass., a management consulting firm, in a growth study prepared for STEEL.



Nearly 1 Million More Workers Will Be Needed Within 20 Years

This charts both hourly and salaried employees for each census year from 1947 through 1957. Government figures are not available in earlier years. Although data extend back for only a decade, the trend for the period is stable, and a projection for 20 years is believed warranted. Experience shows that established growth trends change slowly. But actual conditions in any future year may fluctuate above or below the trend. So all six of these projections represent probabilities, not precise predictions.

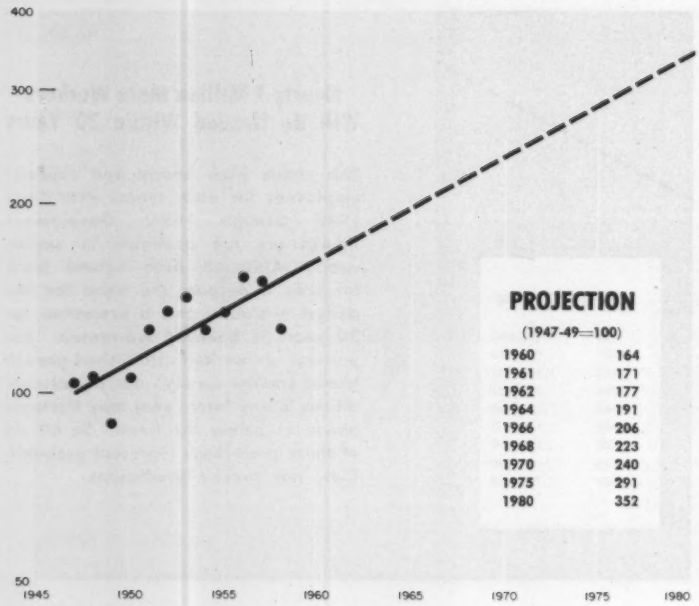


Machinery Prices May Rise 63.8%

This is a synthetic price index. No wholesale product price analysis for nonelectrical machinery is available from government sources. It's derived this way: Set up an index for value added by manufacture, using 1947-49 as the base of 100. Then divide that by the corresponding Federal Reserve Board index of industrial production for nonelectrical machinery. The resulting index reflects the inflation likely for S.I.C. Group 35.

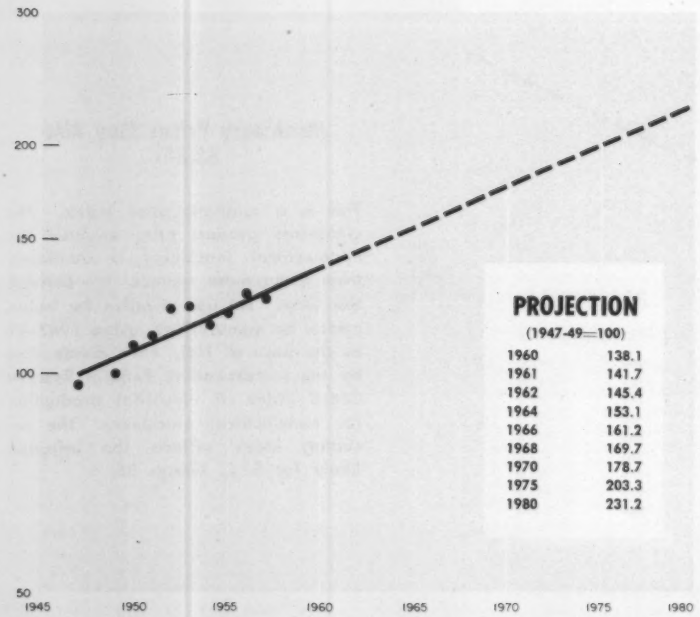
(*Please turn to Page* 150)

• An extra copy of this or the first five articles in the six part series (STEEL, June 13, p. 122; June 27, p. 54; July 11, p. 56; July 25, p. 84; and Aug. 8, p. 64) is available. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. By using material like this, you may win $1000. For details, see Pages 5 and 6.



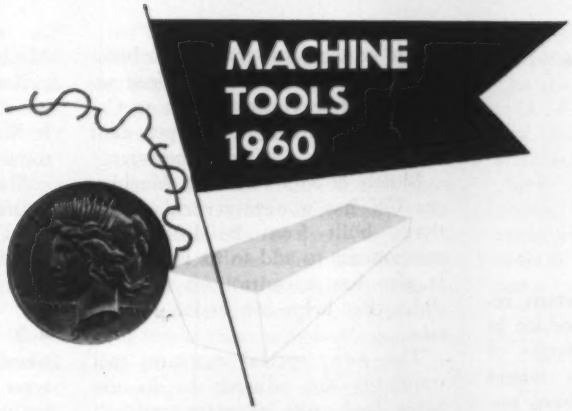
Physical Output Will Be Twice As Great by 1980

The physical output index for nonelectrical machinery is available from the Federal Reserve Board only for 1947 through 1958. The major products included in S.I.C. 35 are machine tools and other metalworking machinery, engines and turbines, farm equipment, construction, mining, and material handling equipment, special industry equipment, general machinery, office machines, service industry machines, and miscellaneous machinery, except electrical.



Productivity to Rise 68.1% in Nonelectrical Machinery

This index (1947-49 = 100) shows technological productivity of all wage and salaried employees per manyear. This is also limited by the availability of the physical output index only back through 1947. The physical output index (above) is divided by a special index of total manyears. The manyear figures were derived from Bureau of the Census data, as are many of the statistics in these six charts.



THE WORLD'S MOST MODERN MACHINE SHOP

That's what you'll find in Chicago next week. Three shows will premiere a new generation of machine tools and related equipment. To help you know what to look for and how to plan your time, here is a report on some of the highlights. For those who don't make it to the shows, this article covers some of the developments that will be talked about

SELDOM do you know the source of your next good profit making idea. Next week will be the exception if you attend the three concurrent shows (The Machine Tool Exposition—1960; the 1960 Production Engineering Show; and the 2nd Coliseum Machinery Show) at Chicago.

That's why more than 125,000 metalworking managers will be there. But the sheer size of the shows will make it tough for them to find, let alone evaluate all the developments that can pay off in their plants.

For example, the Machine Tool Exposition will feature more than 1000 machines, most of them at work. If a visitor has a prime interest in only a third of the machines, and if he spends no more than 10 minutes at any one of them (not enough in most cases), it will take him 7½ days to make his rounds, missing lunch, the call of nature, and the two other important shows.

It will take as much planning and organization to wring a maximum return from the shows as it does to squeeze efficiency out of a production line. The highlights reported here can help you spend your time on the developments most important to you. The list is not (and cannot be) a complete inventory of the shows. It is a report of some of the developments the builders themselves believe significant.

Three Trends

New developments are designed to help you: Reduce labor costs, get increased equipment versatility, or make parts more precise.

• 1. Labor cost is being cropped by trends like those toward more automatic control, or easier, faster manual operation, or in some cases, just faster cycle times.

Here are some examples:

Both Landis Tool Co. and Norton Co. will display completely automatic, integrated lines, including automatic loading and unloading, for grinding automotive crankshafts.

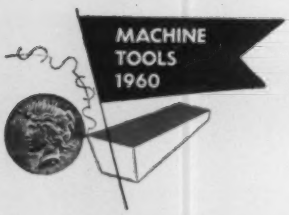
On a new, Nebel Machine Tool Co. lathe, the levers are gone—all speed changes in the 43 to 3500 rpm range are made by pushbuttons.

Hill-Acme Co. will unveil its first, completely automatic, hot forging machine. It's capable of turning out a part a second.

Three, multiple operation drilling and tapping machines will be introduced by Kingsbury Machine Tool Co. All have automatic cycles.

Magnetic tape controlled, horizontal diesinking machine that will be shown by Giddings & Lewis Machine Tool Co. has trimmed 43 per cent of the manufacturing time, 67 per cent of machining time, and 62 per cent of bench and polish time from the production of a hammer die.

(*Please turn to Page* 152)



• 2. Flexibility is the constant requirement of shops that produce in short lots. It's also the target of mass production industries, where product change has sometimes necessitated extensive equipment changes.

Here are examples:

Cincinnati Lathe & Tool Co. will demonstrate a tape controlled lathe, turning out a variety of stepped shafts, no two identical parts in succession.

An automatic chucking lathe has toggle switches to set machine functions and speeds, a dial for feed selection. The Gisholt Machine Co. lathe can be set up 70 per cent faster than its 1955 predecessor.

Motch & Merryweather Machinery Co. has a new vertical turner that's built from building block components to add to its versatility. It also has a control on the tool slides that helps conversion to new jobs.

The new, special machine tool standards are adhered to in the bases, feed units, adapters, and columns for specials shown by Buhr Machine Tool Co. The standards simplify the task of machine modification. Other exhibitors of building-block units include W. F. & John Barnes Co., and Snyder Corp.

You can dial in the dimensions to control positioning of the machine table and spindle on the DeVlieg Machine Co. Jigmil.

Both changeover and setup time are reduced on Cleveland Automatic Machine Co.'s single spindle automatic.

Shoe type centerless tooling on internal grinders (Bryant Chucking Grinder Co.) is responsible for a reduction in the time it takes to change the setup.

• 3. Precision is the third major trend that will apply to nearly every type of machine shown. Many builders cite a significant increase in rigidity—gaging techniques.

Lees-Bradner will show a gear hobbing machine that will take workpieces up to 12 in. in diameter. The company feels precision normally associated with small gears can be held on larger parts.

Both Brown & Sharpe Mfg. Co. and Cincinnati Milling Machine

How Numerical Control Can Pay Off

To Machine This Cast Iron PART ON A . . .	You Need This Fixture and Bushings RADIAL DRILL	You Need a Holding Fixture and Tape TAPE CONTROLLED DRILL
TOOLING COST	$755	$45
SETUP TIME	15 minutes	15 minutes
TIME FOR EACH PART	15.3 minutes	10.7 minutes
COST FOR MACHINING (Based on 100 piece lots, 1000 parts made per year)	$2.96 per part	$1.81 per part

SAVED: $6.35 AN HOUR BY USING TAPE

THERE'S no mystery about the amount of attention numerical control will get in Chicago. More than any other single development in the last five years, it offers metalworking production men a chance to take large slices out of manufacturing costs.

Here's a case in point.

The part is a cast iron mounting base, made by Fosdick Machine Tool Co., Cincinnati. Since the part was made on radial drills and is now made on a numerically controlled layout drill, the figures are accurate, not estimates.

• COST INPUT—The part used to be run on a 4 ft radial drill that costs $8734 today. Now it's run on a numerically controlled layout drill. Cost: $34,000. Fixture cost for the radials: $755. Since the tape replaces the fixture for the part, all that's needed is a simple holding fixture. Cost: $40. For tape, it also costs $2.50 for 30 minutes of programing time, another $2.50 for typing and checking the tape. Fixture, programing, and tape costs total $45.

The hourly cost of operating the radial drill is $8.50, including direct and indirect labor, overhead, and amortization. Cost of the numerically controlled drill on the same basis is $9.75 an hour.

Setup time on both machines is 15 minutes. Machining time on the radial is 15.3 minutes. On the tape controlled machine it is 10.7 minutes.

• THE PAYOFF—Engineers figured the exact cost per piece for each of the manufacturing methods. They applied the hourly rates for each of the machines and charged off the

Co. will show equipment that will grind shafts to fit mating parts within a few millionths of an inch.

Covel Mfg. Co. has a production OD grinder with an electronically controlled cycle and automatic sizing. The company says the machine will hold tolerances of 0.000050 in.

Barber-Colman Co. says one of its hobbing machines will turn out AGMA Class 3 gears on a production basis.

A two step, Micromatic Hone technique will finish truncated spheres (like ball studs) to a sphericity within 0.0003 in. and will generate a surface finish of 6 to 10 microinches.

Numerical Control

Five years ago, not many numerically controlled machines were shown. Most were either special purpose or prototypes. This year, you'll probably be able to count more than 100 machines.

Some builders believe numerical control is the most significant single offering the industry has made in several decades. Some examples:

At least four builders will show programed and numerically controlled tool change (see Page 163).

R. K. LeBlond Machine Tool Co. will show a lathe with continuous path numerical control. The control works from punched tape—can be programed directly from the drawing without a computer.

The systems of several manufacturers, including Heald Machine Co. and Edlund Machinery Co., have tapes that tell the operator when it's time to change tools and which tool should be used next.

Engineers at Ex-Cell-O Corp. have designed a numerically controlled machine that converts from a template grinder to a boring and turning machine with a simple change of the machine heads.

A 16 in., vertical, Hydro-Tel milling machine (Cincinnati Milling Machine Co.) will be equipped with three axis contouring numerical control. It can be used to generate either a standard part or a reverse image (or both) from the same tape.

Famco Machine Co. will show a new, three axis controlled milling machine.

A tape controlled lathe, with simple programing, will be announced by Barber-Colman Co. The system is basically mechanical.

Full depth control will be one of the features pointed up on a numerically controlled drilling, tapping, and milling machine built by National Automatic Tool Co.

Ekstrom, Carlson & Co. will

These two photos dramatize another advantage of numerical control. The familiar jig and fixture storage rack at left houses the tooling for a variety of jobs. The tools, worth "many hundreds of thousands of dollars," are stored in an area where floor space is expensive, and they must be repaired and maintained religiously. At right, the "tool" storage for numerically programed jobs. Each folder represents a separate part

cost of the fixturing over the total number of parts they expected to make with the fixture. They also figured on different sized lots, so the setup time could be spread over a varied number of parts.

For a total output of 1000 parts, the costs look like this:

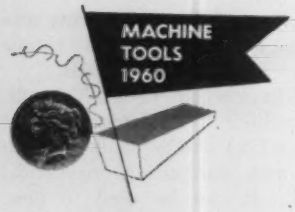
Lot Size	Cost per Piece	
	Radial	Tape
10	$3.15	$2.03
20	3.04	1.91
50	2.98	1.84
100	2.96	1.81

The engineers found they'd need a second radial for 0.42 of the time to equal output of the tape machine—which would raise the cost of radials charged to the work to $12,402, the rest of the cost of the second machine being charged to other work.

Also, based on an expected run of 1000 parts a year, in lots of 100, the machines would do 11 different jobs, need 11 fixtures worth a total of $8305. So the total cost of the radials and fixtures comes to $20,707.

Since the tape controlled machine will save $245 a week, it will take only 54 weeks to overcome the disadvantage of higher initial cost.

In addition, with tape the engineers have cut the leadtime on the parts from weeks to hours; they have achieved greater flexibility than they had; quality will probably be better since it is not dependent on bushing wear; and the cost of fixture maintenance or modification is eliminated.



show a three axis, continuous path controlled milling machine that can operate from either punched or magnetic tape. It's a traveling table, vertical spindle, bridge type machine.

A turret lathe (Gisholt Machine Co.) will have continuous path, magnetic tape control for tools on both the hexagon and cross slide. An economical tape recorder lets the operator make his tapes with less than a day's instruction.

King/Elmes Div., American Steel Foundries, has a 46 in. vertical boring and turning machine that's programed with jumper cords on a patchboard.

Brown & Sharpe Mfg. Co. will show two numerically controlled machines, one with a tape controlled table, the other a tape controlled cam milling machine.

A Jigmil (DeVlieg Machine Co.) will be completely under the guidance of a tape control system engineered and built by the company.

Another version of the numerically controlled horizontal boring, drilling, and milling machine will be introduced by G. A. Gray Co.

W. B. Knight Machinery Co. will show a numerically controlled jig borer that has a full zero offset to simplify part setup.

Jones & Lamson Machine Co. will unveil a tape controlled turret lathe that will cut production costs by 50 per cent, the company claims.

A new, 200 ton press, made by Hydraulic Press Mfg. Co., has infinite adjustment of ram speed, daylight, stroke, and programing of speed changes at predetermined points. The adjustments can be made from the operating console, or numerical control can govern the program.

LaPointe Machine Tool Co. will show its new, numerically controlled drilling machine.

Burg Tool Mfg. Co. Inc. will demonstrate seven, numerically controlled turret drills; one is a double housing planer type.

Chas. G. Allen Co. will show its first tape controlled, single spindle drilling machine. Table position and full depth are program controlled.

In addition to the DiMill, Giddings & Lewis Machine Tool Co. will feature a 3 in. jig borer with point to point positioning.

The cycle on Warner & Swasey Co.'s numerically controlled turret lathe is programed at the operator's control station, but the machine switches to punched tape for contouring.

Two tape controlled drilling machines will be shown by Leland-Gifford Co. One will drill electronic circuit boards at the rate of 200 holes a minute.

Frauenthal Div., Kaydon Engineering Corp., has a numerically controlled machine that will do either vertical contour grinding or turning.

A tape controlled lathe, by American Tool Works, goes through its cycle automatically. It can be directed to a template for contouring.

Carlton Machine Tool Co. has two, tape controlled drilling and boring machines. One is a vertical, double housing planer type.

Wiedemann Machine Co. will show a numerically controlled, turret punch press (capacity, 15 tons) that will locate and punch 60 holes a minute, including tool changing.

In addition to those and other tape and card controlled machines the builders will show, you'll find exhibits of numerical control makers at the Navy Pier. Included: Bendix Corp.; Farrand Controls Inc.; General Electric Co.; Norden Div., United Aircraft Corp.; Reliance Electric & Engineering Co.; and Westinghouse Electric Corp.

• Many other developments builders are talking about will be hidden in machines that look almost unchanged. Examples: The nearly universal move to boost rigidity

(*Please turn to Page* 158)

"Machines Set New Standards"

Alan C. Mattison, president, National Machine Tool Builders' Ass'n. President, Mattison Machine Works, Rockford, Ill.

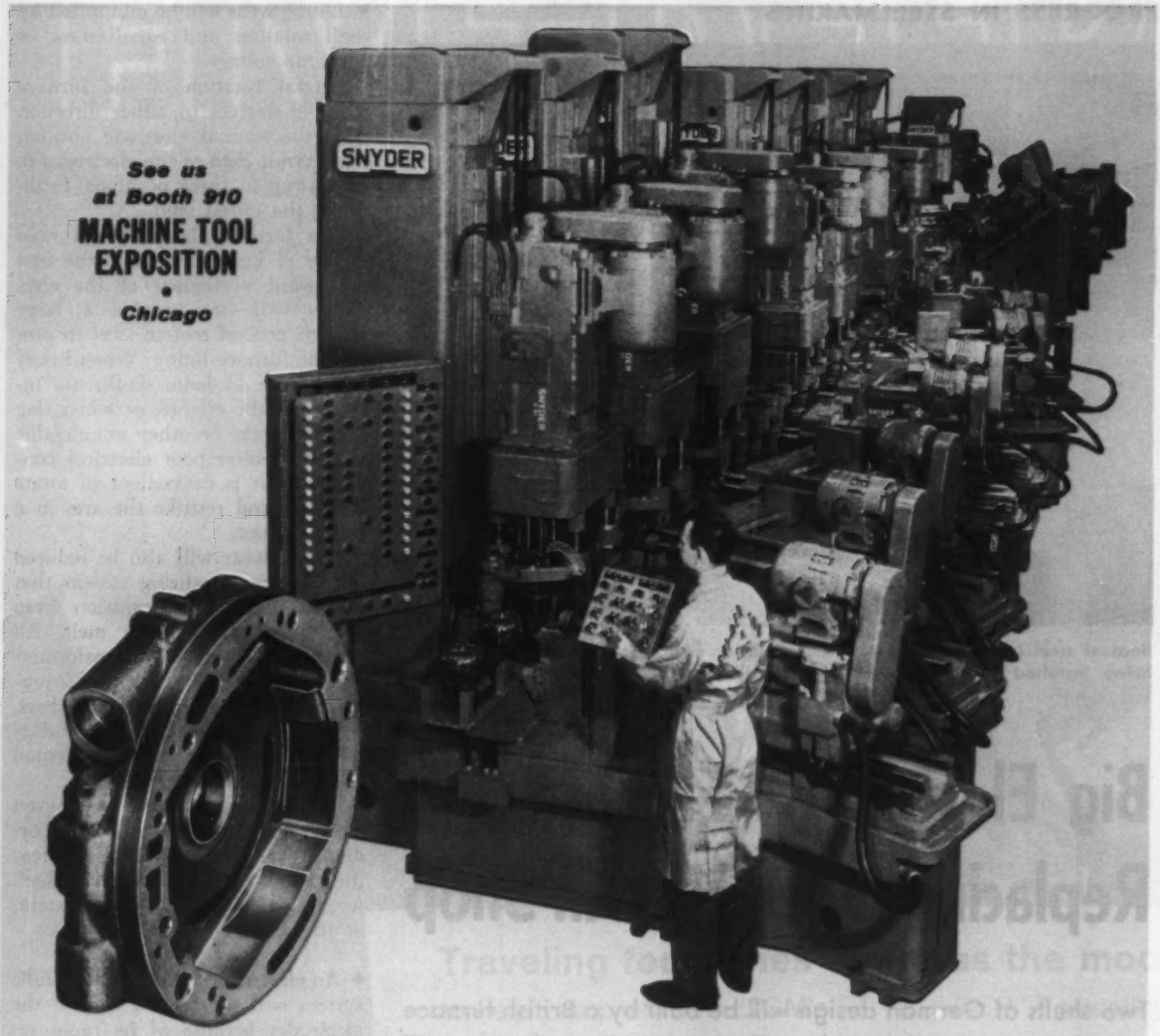
"THIS YEAR, probably more than at any other show in our history, the machine tool industry will be able to demonstrate significant gains in the production efficiency of equipment. Rapid changes in metalworking have thrown a whole new set of problems at both users and builders.

"New tool materials have precipitated speed increases in nearly every type machine. The relentless rise in labor costs has motivated even further reductions in the labor content of finished parts. We've had to intensify our drive for precision, too.

"The gains builders have made in these and other directions will give the user a new set of standards with which to compare his present equipment and methods. We think the comparison will be drastic enough to stimulate modernization at an unparalleled pace.

"We must do just that. The inroads of foreign competition both here and abroad are forcing more and more U. S. manufacturers against a cost wall.

"One of the few ways open to cut costs is to modernize. That's why The Machine Tool Exposition—1960 is of such significance."



SNYDER BUILDING-BLOCK PRINCIPLE MAKES TRANSFER MACHINES VERSATILE, CONVERTIBLE, THRIFTY

Transfer machines built up on the "building-block" principle are old stuff at Snyder and we've built all kinds of them—including the ones that turn corners and bring the part back to where it started from, processed from half-a-dozen angles, gaged, probed, automatically inspected in process, washed and dried and rejects marked for re-processing. Nothing to it if that's what the job calls for. We call it the Snyder Building-block Principle.

Here's an example of a fairly simple Snyder building-block transfer. This 58 station machine performs 74 operations on an automatic transmission pump body, drilling, reaming, tapping, gaging and probing 180 parts an hour at 100% efficiency. Any or all of its 22 segments can easily be converted to perform comparable operations on other parts. Also, the number of segments can be reduced or increased at any time, as need dictates. Your inquiries are invited.

SNYDER
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3400 E. LAFAYETTE—DETROIT 7, MICHIGAN

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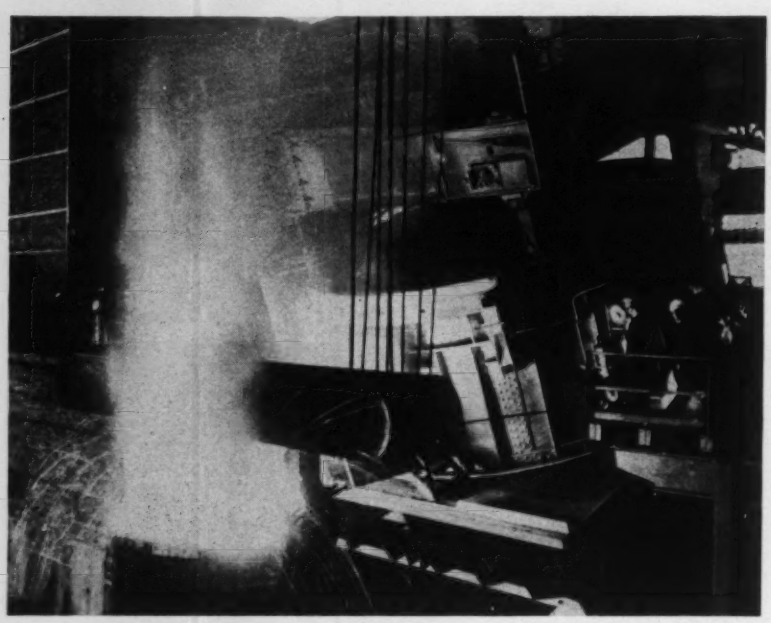


Heat of steel is poured from a 150 ton electric furnace similar to the two shells being installed at Steel, Peech & Tozer Works, United Steel Companies Ltd.

Big Electric Arc Furnaces Replacing Open Hearth Shop

Two shells of German design will be built by a British furnace manufacturer for a British mill; four additional units will boost annual ingot output to 1.35 million tons

INSTALLATION of two, 150 ton electric arc furnaces will start a five year, $25 million modernization program at the Steel, Peech & Tozer Works, United Steel Companies Ltd., Sheffield, England. The furnaces, designed by Demag A.G., Duisburg, Germany, will be built by G. W. B. Furnaces Ltd., of Dudley, England.

The plant's annual ingot capacity will be boosted to 1.35 million tons by replacing 21 open hearth furnaces and 14 chimneys (each 120 ft high) with six of the big electric furnaces.

• The furnaces will have swinging roofs for top charging; shells will tilt for pouring and slagging.

Each shell, capable of melting 1 ton of steel a minute, will have an inside diameter of 24 ft and a nominal capacity of 150 tons. But melting practice will limit heats to 110 tons.

The roof will be lifted from the shell for top charging. After the roof is raised and swung aside, a gantry that carries the weight of the electrode equipment swings around on a king post.

The furnace shell and gantry are mounted on a common platform, resting on rockers so the furnace can be tilted forward 45 degrees for pouring and backward 15 degrees for slagging.

• Lining wear will be minimized by shell rotation and equalization of electrode voltage.

Lateral rotation of the furnace shell 40 degrees in either direction from the normal electrode position will permit each of the electrodes to drill scrap in three positions, facilitating the initial melt.

The furnace charge will consist mostly of light scrap, and the first downward movement of the electrodes will not provide a large enough pool of molten steel to protect the furnace lining. When heavy items, such as ladle skulls, are included in the charge, or when slag covered areas or other nonmetallic inclusions offer poor electrical conductivity, it is convenient to rotate the shell and restrike the arcs in a fresh position.

Lining wear will also be reduced by a power equalizing system that insures uniform transmission from the electrodes into the melt. All bus bar work from the transformers is compensated by the full interleaving of flow and return bars. That insures equal mutual inductance between the phases and equal voltages in the arcs.

The system will prevent uneven wear caused by a hot spot that ordinarily appears on the bank near the center phase electrode. (Such wear also occurs, to a lesser extent, at the other electrode positions.)

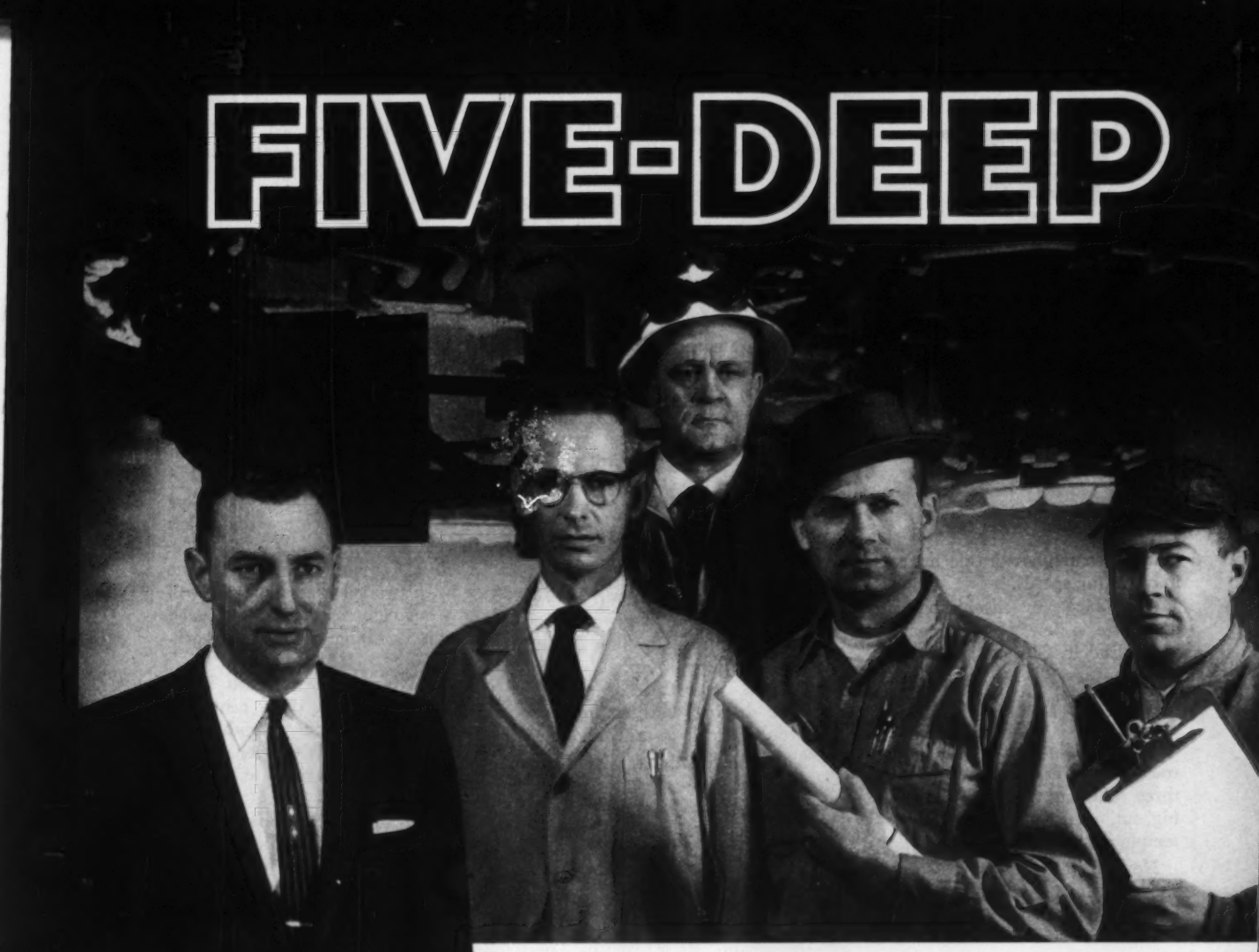
• An electrically actuated, hydraulic system will be used to control the electrodes because of its rapid response.

An impedance type regulator will be used. Current and voltage in windings on an aluminum former vary with arc current and voltage. The former moves in the strong field of a direct current magnet with variations in arc current and voltage.

A servo oil control valve is connected to the former; its movements control the flow of oil to a hydraulic valve that regulates electrode position. The hydraulic control operating piston is subject to oil pressure at both ends; it comes to rest when the two pressures are equal. That prevents possible variation in calibration because of changes in oil pressure or viscosity.

Single acting, ram type cylinders are used for electrode positioning; positive pressure at cylinder exhausts provides the right counterbalance.

FIVE-DEEP



Traveling four times as far as the moon

to help you profit with UCM's "FIVE-DEEP" Ferroalloys

1 Customer Service, ready as your phone, brings Union Carbide Metals' field engineers to your melting plant—from any of 9 sales and service offices. In providing on-the-scene assistance, they gladly make available UCM's integrated experience in the application of ferroalloys to various melting practices.

Lately, their travels to mills and foundries have soared to well beyond the million-mile mark—each year! This customer service is just one of the 5 intangible but ever-present extra values of UCM's FIVE-DEEP alloys which mean better products and bigger profits for you. The others:

2 Technology—many million dollars worth a year—helps you produce better, more profitable metals. UCM's 600-man research and development center is the birthplace of hundreds of new alloys.

3 Unmatched Facilities free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.

4 Global Ore Sources assure you uninterrupted supplies of ferroalloys. UCM's close association with world-wide mines provides dependable raw material sources.

5 Strictest Quality Control—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

"Union Carbide" and "Electromet" are registered trade marks of Union Carbide Corporation.

UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

In standard machines, speed and rigidity gains are almost universal. For show locations, see Page 211

(*Continued from Page* 154)

and the sometimes drastic increases in operating speeds.

Here, listed by machining category, are a few of the machines you'll find in Chicago's shows:

Turning

A multiple cycle Sundstrand tracer lathe can be set up to do three roughing cuts and one finishing cut, all in one cycle from one template.

New Britain Machine Co. will show an eight spindle, automatic bar machine with 2⅝ in. capacity. Its speed range: 99 to 1504 rpm.

Bardons & Oliver Inc. will introduce the largest ram type turret lathe it has built, a No. 6, with bar capacity to 5 in.

One of the new lathes Monarch Machine Tool Co. will show is a precision toolmaker's model that has infinitely variable speeds from 5 to 3000 rpm.

National Acme Co.'s, 9/16 in., six spindle bar automatics have top spindle speeds nearly double those of their predecessors; idle time has been cut in half.

Seneca Falls Machine Co. will unveil a higher output line of automatic tracer lathes.

Cone Automatic Machine Co. Inc. will introduce a 9/16 in., six spindle bar automatic that has speeds to 3500 rpm, with 0.458 second idle time.

Rivett Lathe & Grinder Inc. has a precision speed lathe with one lever control for spindle start, stop, reverse, and speed selection to 4800 rpm.

A Lodge & Shipley Co. tracer lathe has constant speed cutting for top efficiency.

One of the machines shown by Cosa Corp. will do form turning and end operations on small parts. It uses coil stock.

Drilling and Boring

Electric clutches in National Automatic Tool Co.'s new multiple spindle drilling and tapping machines permit pushbutton shifting from drilling to tapping spindles.

Snow Mfg. Co.'s vertical drilling machine has an infinitely variable hydraulic feed that assures steady feed on interrupted cuts or breakthroughs.

Double end, precision horizontal boring machines made by Pope Machinery Corp. are electrically programed to provide fully automatic cycles and faster setup.

Buffalo Forge Co. has a hollow spindle drilling machine for working on difficult-to-drill alloys.

South Bend Lathe Inc. will show a drill press line that has sectional tables so groups can be assembled to accommodate multiple head and column units.

Milling

A chain drive moves parts through a Baird Machine Co. automatic milling machine at production rates up to 6000 parts an hour.

Ram type milling machines at the Van Norman Machine Co. booth will have finger-tip selection of any of 14 spindle speeds.

Kempsmith Machine Co.'s Master-Mill now has a motorized ram with vertical or universal head attachments.

Cincinnati Milling Machine Co.'s exhibit will include a tracer controlled milling machine equipped to automatically mill uphill and down at any angle within 80 degrees inclination from the table surface.

Kearney & Trecker Corp. has a vertical bed type machine with 50 hp and a speed range of 15 to 1500 rpm, with full horsepower at all speeds.

Improved template following by the tracer is cited as a major gain on the milling machine that will be shown by Greaves Machine Tool Div., J. A. Fay & Egan Co.

A vertical, toolroom milling machine has been designed to sell for less than $1000, says the maker, U. S. - Burke Machine Tool Div., Cincinnati Mfg. Corp.

Grinding and Finishing

Hill Acme Co. says its more rigid, horizontal spindle grinding machine is capable of holding tolerances of 0.0002 in.

Maintenance ease is a key design feature of a vertical honing machine to be shown by Barnes Drill Co. Also, the controls have been arranged for operator ease.

Blanchard Machine Co. grinders have a dry-base feature that takes the coolant and sludge out of the machine. One machine at the show, a two spindle automatic, will have an eight station fixture, each station handling a different workpiece.

Van Norman Machine Co. is using crush dressing on a centerless to boost production. Another development: Grinding inner races of miniature ball bearings to 50 millionths.

One of the machines Landis Tool Co. will show has Microfeed, in which feed increments are controlled by a contact gage. The company says the method holds tolerances in the millionths for size and straightness, 10 millionths for roundness.

Universal joint spiders will come off one of the Gardner Machine Co., automatic, double disc grinders at the rate of 2400 an hour. The machine has automatic gaging.

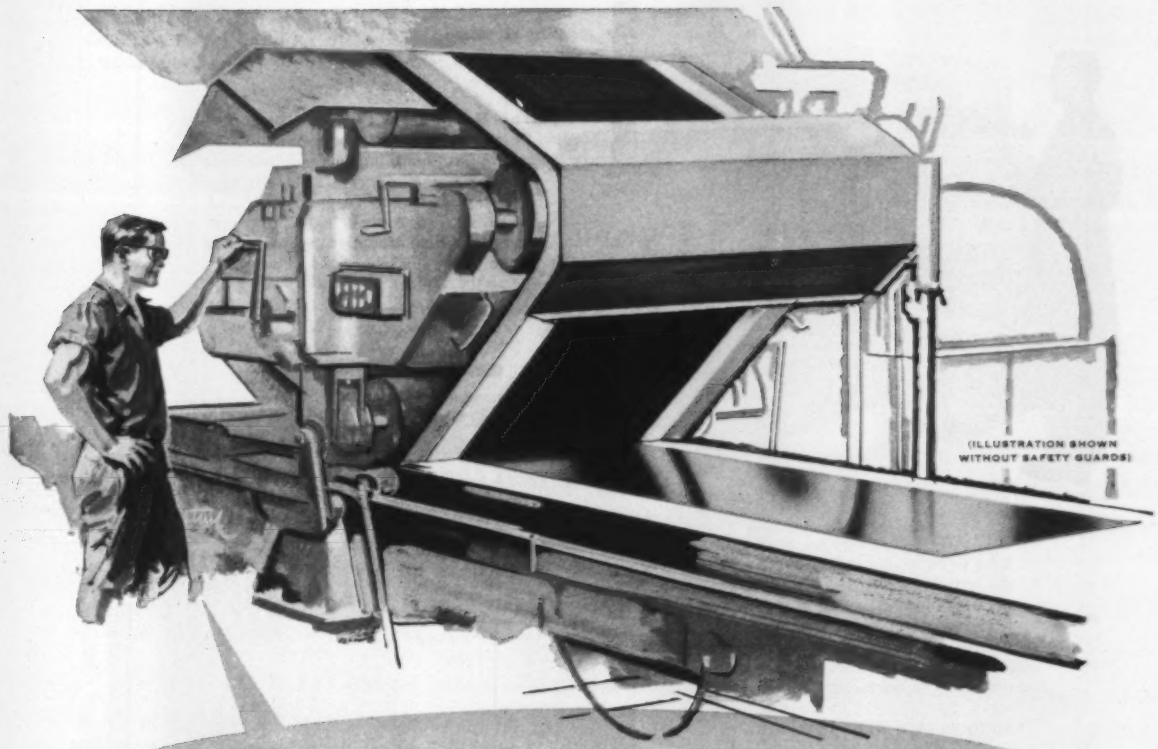
At wheel speeds to 9200 sfpm, a Sheffield Corp., crush dressed form grinder will be finishing seven surfaces on two, piston rod shafts at once—finishing the two parts in 6 seconds floor to floor time.

A Besly-Welles Corp., vertical disc grinder will be working with automatic sizing and automatic loading and unloading to wring extra idle time from the machine cycle.

Taft-Peirce Mfg. Co. will introduce the machine tool version of its Microstoning process for improving surface finish and roundness.

Oliver Instrument Co. has four, new tool grinders, including one for face mills with an increased capacity to take 6 to 24 in. cutters. The

(*Please turn to Page* 162)



ASK YOUR POLISHER ABOUT THE DIFFERENCE IN STAINLESS SHEET

ALLEGHENY LUDLUM SHEET sets the standard for surface quality. Polishers will tell you—they handle all kinds and they should know. They want stainless sheet without flaws, a smooth surface ready to take further polishing to meet specs.

For stainless sheet delivered to the polisher with an irregular surface, or containing flaws, needs extra work that takes time and adds to cost—even causes loss of thickness.

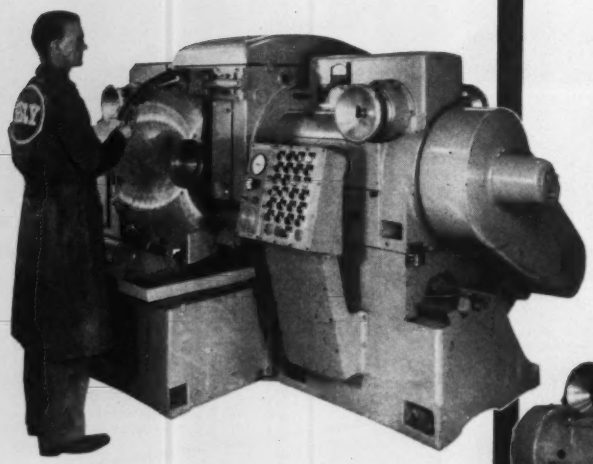
That's why the polishers prefer to work with A-L stainless sheet. For A-L stainless sheet is always smooth . . . a surface without flaws . . . quality stainless, order after order. Your polishing department will also give an enthusiastic reception to stainless sheet from Allegheny Ludlum. Polishers think more of A-L stainless sheet—they will think more of you for ordering it for them. Remember, the pay-off is in the polishing.

For consistent temper, tolerances, and finish in flat rolled stainless products, call your Allegheny Ludlum salesman, or write: *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. S-8-2.*

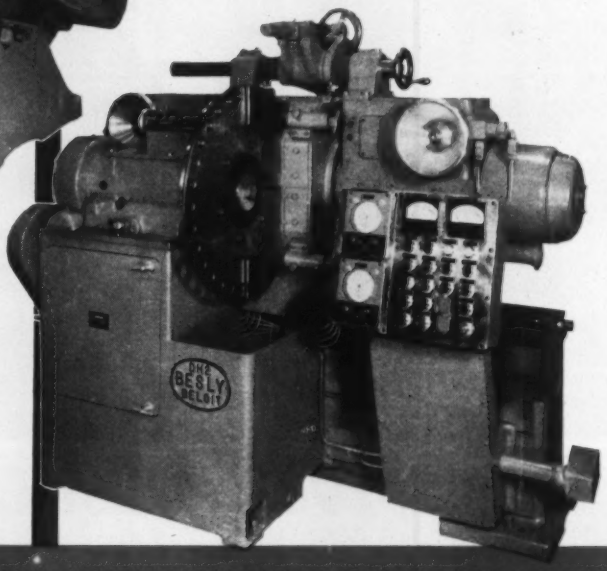
ALLEGHENY LUDLUM

EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

3119

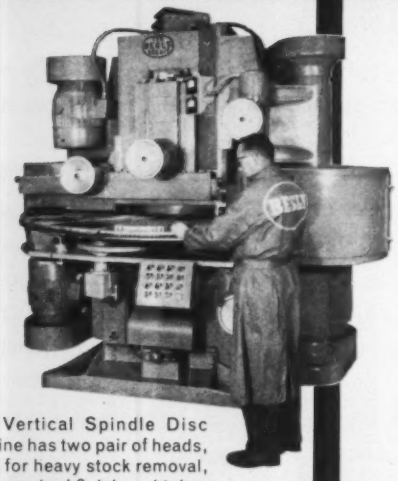


The **Besly DH4** Double Horizontal Spindle Disc Grinder squaring and finishing hardened, high-speed steel tool bits at 600-per-hour rate. Size and parallelism were held to ± .001". Stock removed was .012 per side. Bits distorted by heat treatment were quickly trued up by the twin discs.



Besly DH2 Double Horizontal Spindle Disc Grinder. A smaller version, ideally suited for grinding carbides and ceramics as well as other materials. It features automatic sizing, loading and unloading; excellent for thru feed grinding along with operations requiring clamping of parts such as wrist pins, valve stems, etc., to square grinding surfaces to a mating surface.

for maximum accuracy and productivity...

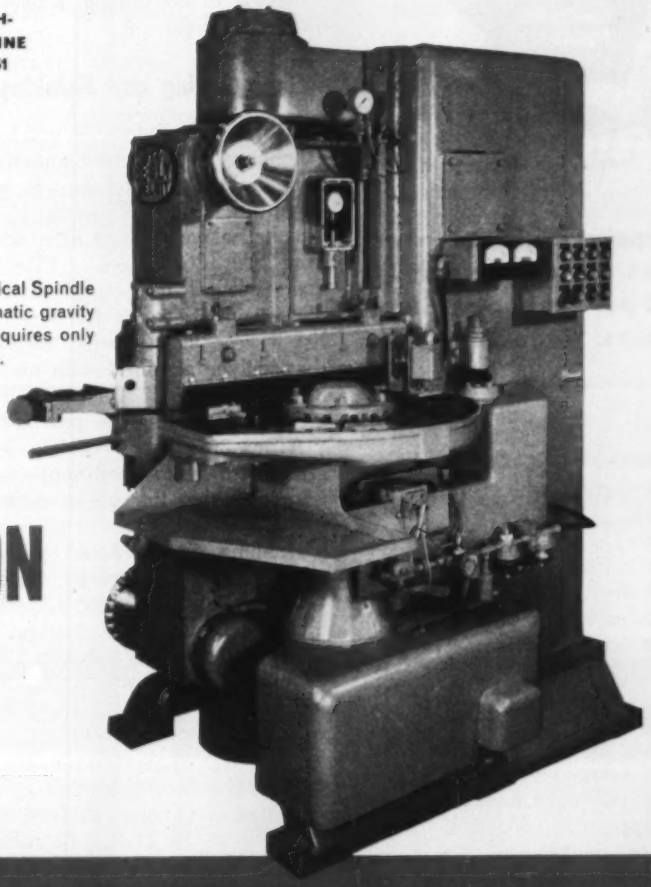


Besly TV3 Tandem Vertical Spindle Disc Grinder. This new machine has two pair of heads, one with roughing discs for heavy stock removal, the other for grinding to required finish and tolerance. The feed wheel, mounted on the rotary unit is arranged to oscillate and produce "orbital grinding action" for more efficient grinding, extended disc life and less frequent abrasive dressing. Although the TV3 has many applications, it is of greatest interest to spring manufacturers for grinding spring ends square and finishing to size and flatness. The machine can be purchased with only one pair of heads, and a second pair can be added to double the capacity.

"Precision performance with savings in time and labor" aptly describes the benefits you will realize with a BESLY Double Horizontal Spindle Disc Grinder. Long recognized as superior in the industry, the Besly DH4 Grinder has many features that recommend its application to exacting grinding problems. Exclusive precision quill and clutch infeed provides feed increments calibrated in millionths. Discs can be changed in 30 minutes without disturbing setup, cutting downtime in half. Dressing time is only four minutes, a fifth the usual time! Simplified push-button operation and controls, built-in dials, gages, meters to indicate abrasive conditions, motor load, etc., assure precise results, dependable grinding production.

BE SURE TO SEE THESE BESLY HIGH-PRECISION GRINDERS AT THE MACHINE TOOL EXPOSITION . . . SPACE NO. 251

MMTPE — MODERN MACHINE TOOLS — PRODUCTION EFFICIENCY



Besly DV2 Double Vertical Spindle Disc Grinder with automatic gravity feed and discharge. Requires only 8-ft. by 8-ft. floor space.

for

PRODUCTION DISC-GRINDING

. . . Better see Besly! **DOUBLE VERTICAL GRINDERS**

The Besly DV2, illustrated is representative of the new line of double-vertical spindle disc grinding machines now being manufactured in our South Beloit plant. Designed for production use, this unit is shown grinding top and bottom of 3/8" thick throw-away carbide inserts at a rate of 3,000 passes an hour. Three passes are required to remove .016" of stock. *Tolerances on the final pass are held within .0003" for flatness, parallelism and size, with a 4 micro-inch finish.*

The DV2 will grind parts that range from .050" to 2½" in thickness and .375" to 3" in diameter. In addition to grinding carbides or hard ceramics that require diamond abrasives, the DV2 also grinds stampings, plastic parts, alnico magnets, bearing races, coil springs, carbon parts and the like with resinoid-bond abrasive discs.

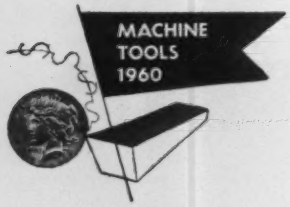
WRITE FOR THIS NEW illustrated catalog describing Besly Disc Grinders.

BESLY®

BESLY-WELLES CORPORATION

120 Dearborn Avenue, South Beloit, Illinois

Grinders and Abrasives • Taps • X-Press Taps® • Drills • Reamers • End Mills
Tool Bits • Gages • Carbide Tipped Tools • Blanks • Inserts • Holders



Pressmakers aim at more strokes per minute, get 80 to 100 per cent gains. Show locations: Page 211

(*Continued from Page* 158)

cycle, including wheel dressing, is automatic.

Norton Co. has boosted the speed of its cylindrical grinders from 6500 to 8500 sfpm. On many jobs, the company says, this can mean a 30 per cent time reduction.

Crane Packing Co. has redesigned a lapping machine so it takes up less space but retains its capacity. It will handle a wide range of shapes and can hold tolerances of one light band, the company says.

A Mattison Machine Works, rotary table grinding machine has 125 hp, enough to permit heavy stock removal. The machine has a 72 in. diameter chuck.

An automatic finishing machine made from building-block units will be shown by Osborn Mfg. Co. It will be finishing 720 parts an hour.

Planing and Shaping

Triple cutting on a planer will be shown at the G. A. Gray Co. exhibit. The new universal planer cuts on the forward stroke, on the reverse stroke, and it simultaneously finish planes.

Cincinnati Shaper Co. will show a 16 in. shaper with a hydraulic tracing attachment that provides automatic duplication from a simple sheet template.

Smith & Mills Shaper Div., Nebel Machine Tool Corp., also has an electronic duplicating atachment for shapers that controls the vertical table travel.

One of the machines Rockford Machine Tool Co. will show is a 72 in., open side shaper that's two large machines in one; it can be converted to do milling with a 3 hp milling head.

Gear Cutting and Finishing

Fellows Gear Shaper Co. will have a hobbing machine with automatic load, unload, and cycle. It will be cutting 7 pitch, 23 tooth, ¾ in. face helical gears (two at a time) from SAE 8620 steel. Floor-to-floor time: 1 minute, 57 seconds.

National Broach & Machine Co. has a gear tooth honing machine that will be equipped with an automatic loader. Four separate methods of honing are provided.

A new, Michigan Tool Co. gear grinder crowns the teeth while form grinding either internal or external gears.

Hobbing time is reduced on a vertical machine shown by Barber-Colman Co. With an automatic cycle and automatic loading, it takes 30 seconds to hob two 12 to 14 pitch, 9 tooth, automotive spur pinions.

An automatic gear checker built by Illinois Tool Works can inspect up to 600 gears an hour.

A new hard gear finishing machine, developed by Cleveland Hobbing & Machine Co. uses high frequency oscillations of the tool on the work to provide the finished surface.

Broaching

Lapointe Machine Tool Co. will show a 1½ ton, 12 in. stroke broaching machine with an automatic puller. It broaches at 5 to 10 ft a minute.

National Broach & Machine Co. has a vertical, hydraulic press type broaching machine that uses a one piece broaching tool to produce external spur and helical gears.

Colonial Broach & Machine Co. has adapted the twin ram method to a pulldown machine to increase output. One fixture can be loaded and unloaded while the other is working.

Forming

Minster Machine Co. will show a high speed, 2½-in. stroke press that operates at blanking speeds (400 strokes a minute). Also, some gap presses will hit 400 to 800 strokes a minute.

Elmes/King Div., American Steel Foundries, has a line of oil hydraulic presses that operate from the shop air line.

With an automatic cycle, dual clutches, and a two speed transmission, a Cincinnati Shaper Co. press brake can give high production (you may gain as much as 60 per cent) on jobs where bending itself must be done slowly.

A 400 ton, aluminum impact extrusion press (E. W. Bliss Co.) will run at 120 strokes a minute—double the rate of previous models.

Lake Erie Machinery Corp. has a double apron bending brake that can produce intricately formed sections (such as cones, deep channels) without dies.

A single geared, open back, inclinable mechanical press built by Ferracute Machine Co. has increased rigidity, an air friction clutch, and a brake for severe operation.

U. S. Tool Co. Inc. will demonstrate a double ended, multislide machine that takes coil stock fed at both ends and turns out two different stampings, or can be used to make and assemble a pair of parts.

L&J Press Corp. says that it has boosted the rigidity of its 125 ton OBI press.

A line of hydraulic assembly and trimming presses from Hannifin Co. has higher speed rates.

Denison Engineering Div., American Brake Shoe Co., has a 25 ton, servodriven press that will stamp at 600 strokes a minute.

One of Greenerd Arbor Press Co.'s heavy duty bench presses will work at 38 four in. strokes a minute.

An OBI press, introduced by Niagara Machine & Tool Works, will work at a variety of speeds up to 1000 strokes a minute.

A speed gain of as much as 80 per cent over conventional rates is being claimed for a draw press from Cleveland Crane & Engineering Co.

Danly Machine Specialities Inc. will show an automatic, high speed, 400 ton coil fed press complete with auxiliary equipment.

Fenn Mfg. Co.'s new, stationary die swaging machine is designed for jobs (such as square or rectangular shapes) where it's necessary to keep the work from rotating.

Pines Engineering Co. Inc. has a high speed bending press that increases production 25 to 50 per cent by bending two tubes in each stroke.

• Builders will also highlight these machines:

Landis Machine Co. has completely automated thread rolling.

A 400 ton capacity billet shear by Buffalo Forge Co. handles up to 5 in. square or round billets at speeds to 60 strokes a minute.

Eastern Machine Screw Corp. will show a line of rise and fall abrasive belt grinders.

Bodine Corp. has a double end continuous tapper that taps on one end while withdrawing at the other.

Peerless Machine Co. will introduce a contour saw with infinitely variable speed drive from 50 to 6000 ft per minute.

Beatty Machine & Mfg. Co.'s new rotary shear will cut 1/4-in. mild steel at 8, 14, and 20 sfpm.

A keyseater, shown by Mitts & Merrill Inc. can be modified to cut splines, serrations, and die profiles, both internal and external.

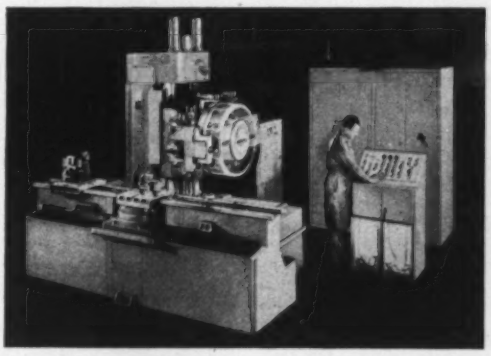
A new beveler for working on plates is 10 to 12 times faster than older models, says American Pullmax Co. Inc.

DoAll Co. has come up with a

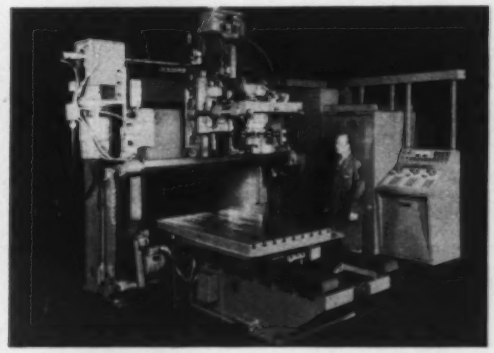
Programed Tool Change Becomes a Trend

Newest of the developments in numerical control is the automatic tool changer. For many production men, Chicago will be their first opportunity to look at the mechanisms that get instructions from tape, select the right tool, take the old one from the spindle, put the new one in, and go on with the next operation.

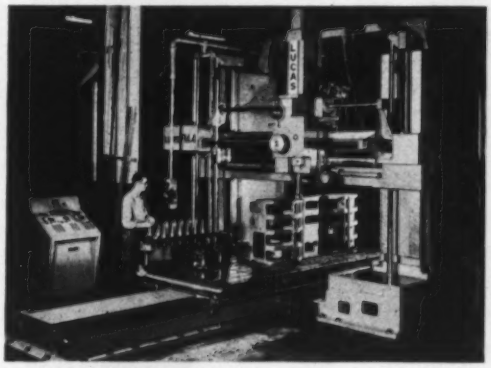
Here are four of the machines:



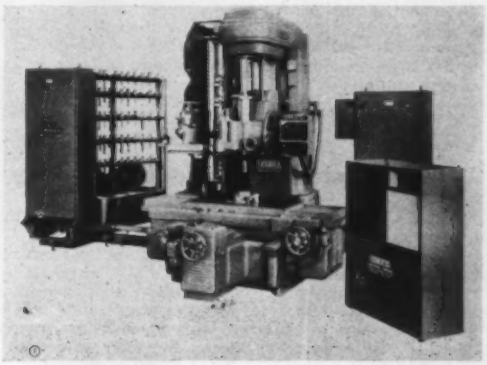
Kearney & Trecker Corp.'s Milwaukee-Matic Model II stores the tools in a circular drum. The programer specifies the tool by coding special tool holders—tools can be in any location in the drum. Selection of the next tool takes place without interrupting machine operation



Sundstrand Machine Tool Co. will introduce a vertical spindle, three axis, numerically controlled rail type machine with 60 in. table travel, 40 in. head cross travel, and 24 in. vertical head stroke. Tools are picked from a magazine that has 20 positions



Lucas Machine Div., New Britain Machine Co., has unveiled the Versa-Tronic with three axis control, for boring, drilling, milling, or tapping. Tools are stored in racks at the table sides; the spindle position is programed over the proper tool, automatically picks it up



Fosdick Machine Tool Co. will premiere this 54-P precision boring machine with tape control of saddle, table, speeds and feeds, depth, head, and automatic tool change. The automatic tool changer beside the machine can hold as many as 100 boring, drilling, and end milling tools

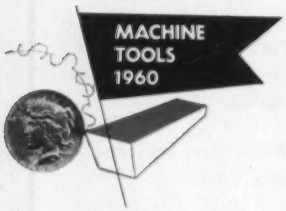
power cutoff saw that's two to three times faster than its predecessors.

The Challenge

STEEL's survey of buyers proved that metalworking needs new equipment and intends to buy it.

Increasing competition from abroad and soaring costs that can't be absorbed in price increases are putting a squeeze on profits. More efficient production is a must.

In Chicago, the task will be to find the equipment with the best possible payoff potential.



Four Users View Their Needs

". . . we shall be most interested in numerical control"

ADRIAN O. HOLMBERG
Executive Vice President-Mfg.
Miehle-Goss-Dexter Inc.
Chicago

SINCE ALL our manufacturing divisions can be classified as low production plants, we will be looking for standard machine tools that not only increase our production efficiency but also let us better utilize floor space by eliminating possibly two or three machines for each new one we purchase.

The machines we shall be most interested in will be those that have been designed to operate under numerical controls. From experience, we are well aware of the savings that can be made with this type machine tool.

Naturally, some of the new equipment we buy will not be numerically controlled. We also will seek out the equipment that will offer us increased accuracy, simpler setup, and easier operation. We are specifically interested in large surface grinders and electrolytic process machines.

". . . we want machinery that can be operated in groups by one operator"

LES SEAGER
Chief Production Engineer
Eimco Corp.
Salt Lake City, Utah

WE WILL be looking at machine tools that are easy to set up for diversified products. We'll concentrate on automatic features such as numerical control to improve operator efficiency at tools that operate with a high degree of efficiency yet require a minimum of operator training.

We will also be particularly interested in machinery that can be operated in groups by one operator.

We want to see machines that are designed to take advantage of the improvements in cutter technology.

In numerically controlled machinery, we want to see equipment that can be updated to keep pace with fast moving improvements in electronics.

". . . we want units that can be made into a self-contained automated line"

HARVEY GITTLER
Mfg. Engineering Manager
Underwood Corp.
Hartford, Conn.

THE GREATEST need of business machine producers is for equipment that will turn out high volume and still be flexible enough to handle a wide variety of parts.

In attending The Machine Tool Exposition—1960, we will look for machine tools that can be made into a self-contained, small automated line by adapting special feeding and indexing mechanisms. It may be that the building block trend will just fit our ideas of economy in certain types of automated lines.

In updating our machine tools, speed (output) is probably the most important factor. It helps us justify the cost of new equipment far more than setup time and flexibility.

Automation and tape control? Like many others, our industry isn't large enough to justify large scale automated equipment, yet our production is too high to make proper use of tape controls.

". . . we seek accessibility, flexibility, quality, and tool capability"

H. C. DAUM
Manager, Machining Process Dept.
Mfg. Engineering Office
Ford Motor Co.
Dearborn, Mich.

AT THE EXPOSITION, we'll be looking for machine tool developments that will alleviate production efficiency problems.

For example, more emphasis should be put on accessibility, changeover flexibility, quality capability, and tool capability.

We want arrangements and systems that permit easy maintenance of mechanical, electrical, and hydraulic components. Accessibility also can ease tool setup.

Now that industry-wide standards for machine components have been adopted, builders are quoting and building to them. But they will need to introduce more flexibility than that.

Quality capability means consistent production of parts within prescribed tolerances. One way to get that would be to monitor process variables with reliable, precise, and versatile devices.

Tool capability is prerequisite to production efficiency. Important aspects: Proper tool geometry and materials to realize optimum speeds and feeds and minimum tool change time.

prediction

NEVER BEFORE SO MANY TREND-SETTING DEVELOPMENTS

NEW DEVELOPMENTS IN AUTOMATED STEELMAKING

●

ADVANCED EQUIPMENT NOT EXHIBITED PUBLICLY BEFORE

●

NEW OXYGEN PROCESSES — INCLUDING AJAX, L-D, ROTOR AND KALDO

●

REPORT ON SOVIET FERROUS METALLURGY

●

NEW PROCESS FOR CHANGING STEEL CHEMISTRY THROUGH OPERATING PRACTICE

●

NEW TECHNIQUES IN INCREASING BLAST FURNACE OUTPUT THROUGH ELEVATING TEMPERATURES

●

COMPLETELY AUTOMATED ROLLING MILL

●

NEW BULK GREASE-HANDLING SYSTEM

●

NEW FURNACE DESIGNS

●

OTHER NEW DEVELOPMENTS IN COMBUSTION . . . ELECTRICAL . . . SAFETY . . . ROLLING MILL . . . AUTOMATIC CONTROL . . . AND MECHANICAL PRACTICES

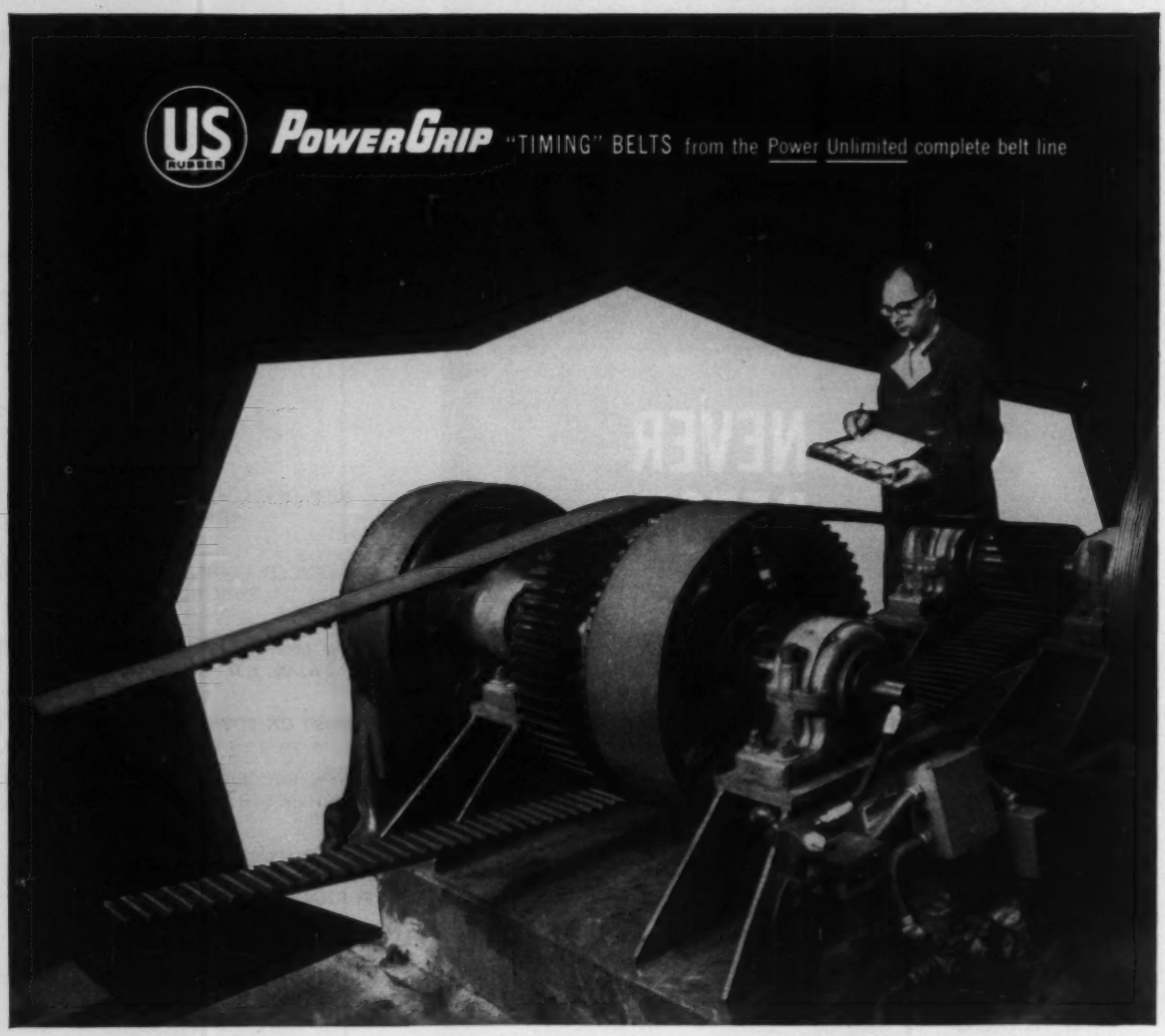
BE ONE OF 15,000 WHO WILL ATTEND to see and hear discussed the many advanced developments of today that will be standard operating practice in the future. Four full days of technical sessions (42 in all) will be held concurrently with AISE's largest Exposition (206 exhibitors, 15% more area than the largest previous show).

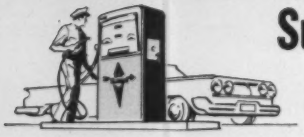
No man concerned with steelmaking or plant maintenance can afford to miss this opportunity of reviewing *the new, the technical, the significant!*

1960 IRON AND STEEL CONVENTION AND EXPOSITION

Sponsored by Association of Iron and Steel Engineers, 1010 Empire Building—Pittsburgh 22, Pennsylvania

SEPTEMBER 27-28-29-30, 1960 • CLEVELAND PUBLIC AUDITORIUM





Sun Oil Company obtains positive results with U.S. PowerGrip "Timing" Belts

The octane requirements for cars are determined by the Sun Oil Company with scientific accuracy. The octane ratings of motor fuels are in turn determined with precision. Nothing is left to chance. This is why the motorist can pull up at a Sunoco station and obtain the correct octane blend for his car.

All of this predetermination is done on precision equipment whose universal joint drive shaft is connected to a dynamometer by a 1¼" pitch U. S. Rubber PowerGrip "Timing"® Belt. In the words of a company scientist, these belts were selected because they give foolproof, positive drive transmission and do not require lubrication, maintenance or attention. Anything less would interfere with the precision of the testing equipment. This is the experience that has caused innumerable design engineers to specify PowerGrip.

This is the belt that has made possible the development and production of hundreds of appliances and equipment, ranging from sensitive electronic devices, office machinery, household equipment and gigantic production machinery. One way to get expert and instant power and transmission advice is from the U. S. Distributor.

See Our **IDEA PLAYGROUND** ★ Booth 119 ★ **PRODUCTION ENGINEERING SHOW**

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Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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MACHINE TOOL PREVIEWS

Fast Grinder Table Speed Reduces Heat Damage

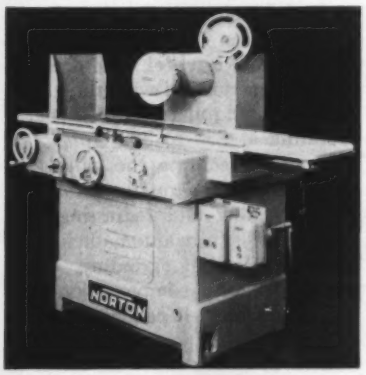
GRINDING machines, shapers, and a worm gear hobbing machine have been developed by Norton.

The Type S-3, hydraulic surface grinders have table speeds up to 150 feet per minute. This reduces grinding time and heat damage, says the company. Minimum rate is 3 in. per minute.

Type CM-1 Multiwheel has been replaced by the Type CM-2, semi-automatic, multiwheel grinding machine. It has many improvements for grinding shafts requiring multiple or wide grinds. Improvements include faster wheel changing, improved CTU type wheel feed mechanism, and standard 42 in. diameter grinding wheels.

General tool sharpening can be handled by the No. 200 cutter and tool grinder. The new design (a wheel slide type) permits faster clearance angle setting.

Two TS hand surface grinders (10 x 16 in. and 6 x 12 in.) have two speed vertical feed, calibrated to 0.0001 in. A wet grinding attachment, dust exhaust, magnetic chucking equipment, and other accessories are available.



Type S-3 grinders have 150 fpm maximum table speed

The 16 in. Hi-Speed and a 24 in. stroke shaper have 16 ram speeds selected by a dial setting.

The 20 TWG hobbing machine is designed for high production of single and double thread worm gears up to 3 in. circular pitch. It uses both hobs and carbide tipped, fly tools.

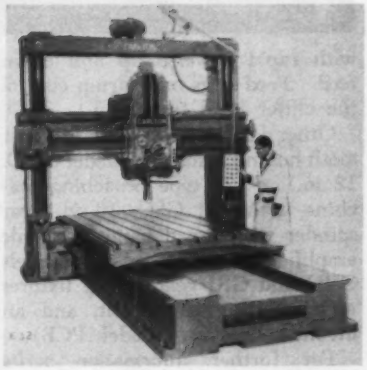
For further information, *write* Norton Co., 50 New Bond St., Worcester 6, Mass. (Amphitheatre Booth 651.)

Tape Control Guides Drilling and Boring Unit

TWO MODELS of tape controlled drilling and boring machines use a tape control system made by Carlton Controls Corp. One model which drills and bores in the vertical plane has a planer type table with double housings and bridge to support the cross rail.

The tape control system directs table movement longitudinally and head motion transversely. The speed and feed preselector are also tape controlled. The table has a 66 by 96 in. working area with a 25,000 lb capacity. The maximum distance between the table and spindle is 50 in. with 38 in. vertical adjustment to the rail. There are 36 spindle speeds and 18 power feeds. A 15 hp motor powers the spindle.

A horizontal drilling and boring machine has a working area of 72 in. (vertical) by 96 in. (horizontal). The spindle is powered by a 15 hp motor. There are 36 spindle speeds and 18 power feeds controlled by a preselector, either manually or by tape. In and out travel of spindle is 30 in. Both vertical and horizontal motions and speed-feed combinations are tape controlled.



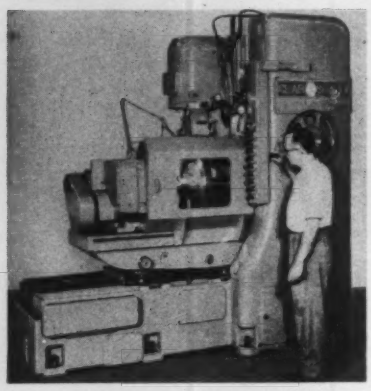
Drilling, boring unit has 36 spindle speeds and 18 power feeds

Other new developments include a small horizontal drilling and boring machine and five sizes of radial drills.

For further information, *write* Carlton Machine Tool Co., 2961 Meeker St., Cincinnati 25, Ohio. (Amphitheatre Booth 849.)

Rotary Gear Shaver Has Tunnel Type Column

A ROTARY gear shaver (Model GCX, 24 in.) is among the machines developed by National Broach & Machine Co. A tunnel type column design has been combined with an extended base. A deep worktable can be moved out from shaving position under the cutter to permit easy loading and unloading of the work gear in an area unrestricted by component interference. The cast iron unit has no knee. The cutter feeds down for shaving and is provided



with rapid traverse up and down feed. Feed dogs on a drum control the cutter head travel.

Other developments include a gear tooth honing machine (Model GHD, 12 in.), a pot type broaching machine, a Model GSC, 10 in. gear speeder with broad band electronic amplifier, new designs of Models GRH and GRJ gear rolling fixtures with charting equipment, and an involute checker (Model PCB).

For further information, *write* National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. (Amphitheatre Booth 1430.)

Magnetic Tape Used to Control Turret Lathe

WITH the Gisholt Factrol 101 turret lathe (with continuous path, magnetic tape control) and a tape recorder, a turret lathe operator can make tapes after less than one day's instruction.

The equipment can handle intricate contour and stepwork. These advantages of using Factrol on standard work are cited: Quick changeover, one set of tools to handle a wide range of work, simultaneous control of both hex turret and square turret tools, and the elimination of extra tools and turret stations normally required to handle angles, chamfers, and radiuses.

Other new equipment includes Masterline AR turret lathes. They combine automatic cycle efficiency with the versatility and quick setup of the hand operated, ram type, turret lathe. Three saddle type, turret lathes have new style aprons with multiple disc, rapid traverse clutches for easier engagement, jogging, and shockfree operation.

A Masterline 1F Fastermatic, automatic chucking, turret lathe has a punched paper tape control (Westinghouse PRODAC System). This is a program digital system comprising logic, scanning, and control of such functions as speed and feed selection and program sequence direction. A 70 per cent reduction in feed, function, and speed setup time over 1955 models and a 90 per cent reduction over pre-1955 models is claimed for the new, 3F Fastermatic. It sets up in 15 minutes. The Model 51-B, general purpose superfinisher has a fast automatic cycle, economical operation, flexibility, and quick changeover for short runs. A redesigned Model 81, single spindle superfinisher handles flat, conical, or spherical surfaces. It's readily adaptable to automatic work handling and is ideal for use with in-out conveyor systems and may be added to existing production lines.

The machines will be shown in Chicago at The Machine Tool Exposition—1960 (Booth 1042). Gisholt equipment to be shown at the Coliseum Machinery Show (Booth 518) includes a CRI-DAN FT80 threading and turning lathe.

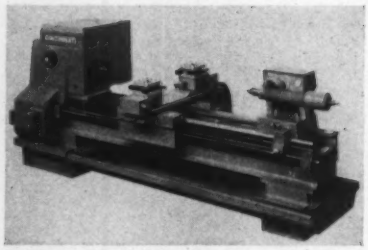
For further information, *write* Gisholt Machine Co., 1245 E. Washington Ave., Madison 10, Wis.

Numerically Controlled Lathe, Drills Introduced

DEVELOPMENTS from Cincinnati Lathe & Tool Co. include Cintimatic turret drills, a Cintimatic numerically controlled lathe, and Hydrashift lathes.

The Cintimatic turret drill provides automatic drilling for a wide range of work with quick and simple setup. Jig and fixture requirements are minimal.

A low cost numerically controlled drill (single spindle 24 in.) can handle automatic production of



parts with many holes of one diameter. Both table positioning and feed cycle are tape controlled.

All machining and operating functions are automatic on the Cintimatic numerically controlled lathe. It's equipped with a Cincinnati Acramatic control system. The lathe is designed for turning stepped shaft work, but will also perform boring and facing operations. Necks, chamfers, radiuses, and other forms are cut with form tools.

The Hydrashift lathe line has preselective power dial speed shifting. The operator dials his next spindle speed while a cut is being taken, preselects his speed change, and the speed shift is automatically made when the spindle is started for the next cut.

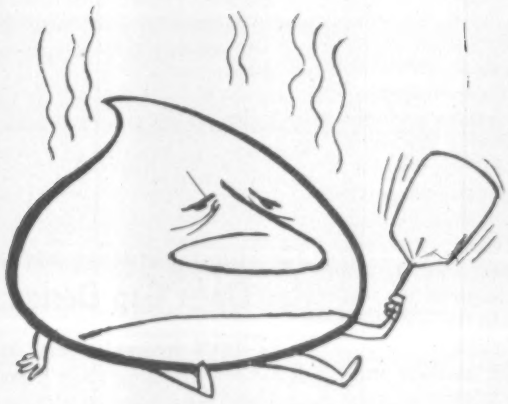
For further information, *write* Cincinnati Lathe & Tool Co., Disney & Rogers Streets, Cincinnati 9, Ohio. (Amphitheatre Booth 934.)

Grinder Handles Two or Four Parts at a Time

CYLINDRICAL forms and grooves can be automatically ground on two or four parts simultaneously at wheel speeds of 9200 sfpm and faster on the Model 182 Crushtrue Multi-Form grinder. The unit has a wheel dressing process that creates a reverse form (of the part profile) in the abrasive wheel. The dressing process is performed with the grinding wheel and roll (steel or carbide) operating at 250 to 300 sfpm. The roll can be fed into the wheel automatically or manually on initial wheel forming and redressing.

The unit is fully automatic including part handling, grinding, wheel dressing, and compensation for wheel dressing. It can be equipped with Sheffield postprocess gaging devices to detect part size trend or to shut the machine down if a predetermined number of out of toler-

How hard is hard? Tests by a locking pin manufacturer showed that hardness varied from 34 to 61 on Rc Hardness Scale. This spotty result caused a high rate of rejects, and a substantial loss of profits.

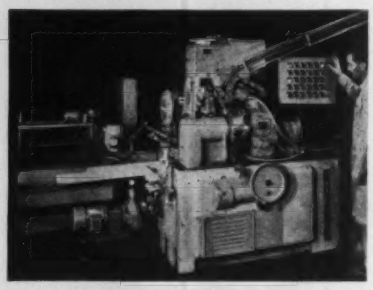


Sinclair engineers, using the Sinclair Quenchol Demonstrator, found the culprit: the quenching oil formerly used lacked cooling power, only 784 rating against 1225 minimum for Sinclair QUENCHOL 521. Now, with Sinclair QUENCHOL 521, hardness is uniformly high–59 to 65 Rc. Working loads are now 67% higher–3 tons to 5 tons per quench. Test your present oil. Call your local representative or write

Sinclair

SINCLAIR REFINING COMPANY

TECHNICAL SERVICE DIVISION • 600 FIFTH AVE., NEW YORK 20, N.Y.



ance parts are produced. The unit has a maximum wheel spread of 5¼ in.; maximum wheel diameter of 20 in.; and a wheel hole diameter of 8 in. Maximum work diameter is 2¼ in. Wheel speeds are variable to 9200 sfm.

Other Sheffield developments include the Model 181-A Crushtrue roll grinder and several instruments and gages. They include the automatic ID, OD, and radial play gage, the brake drum gage, multiple Electrojet selector, the rotating ball Electrojet, and the floor type co-ordinate measuring machine.

For further information, *write* Sheffield Corp., a subsidiary of Bendix Corp., Dayton, Ohio. (Amphitheatre Booth 201.)

Drilling, Drill Grinding Machines Announced

DEVELOPMENT of seven units has been announced by Leland-Gifford:

Two, tape controlled, drilling machines; two, gun drilling units; two, standard, multiple spindle, drilling machines; and a high precision, drill grinding machine.

One of the tape controlled, drilling units (Hole Locator) is designed for drilling electronic circuit boards. The two spindle unit (with self-contained, automatic feed, drilling units, and punched tape control) automatically positions and drills up to 50 holes per spindle per minute. The other has automatic table positioning and is capable of locating and drilling precision holes in a wide variety of production work.

Other units include an 8 in. gun drill with a high pressure coolant tank; a 24 in. gun drill with lead screw feed synchronized to and governed by spindle speed; a No. 1, multiple spindle, drilling machine capable of speeds up to 10,000 rpm; a No. 2, medium duty, drilling unit with continuous speed range from 100 to 3000 rpm through variable speed drive and back gears; and a high precision, Drill Point Master, twist drill grinder that will produce or reproduce a drill point of any specified geometry on drills from No. 80 (0.0135 in.) to 0.250 in.

For further information, *write* Leland-Gifford Co., S. Bridge Street, Worcester 1, Mass. (Amphitheatre Booth 631.)

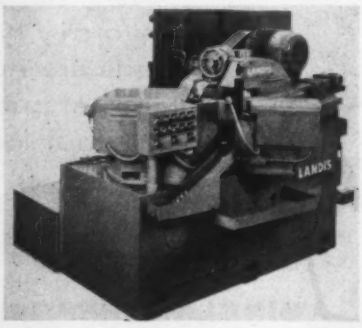
Cylindrical and Surface Grinders in New Line

FOURTEEN cylindrical type grinders and four surface grinders have been developed by Landis.

The cylindrical types include three universal grinders, three plain grinders, two centerless grinders, and seven special purpose high production machines. Features include the Landis Microfeed (for size control) and the Truform dresser for grinding wheels, a separate hydraulic unit containing the oil tank, pump, and motor. Landis claims that by taking the oil reservoir out of the bed casting, heat buildup in the oil cannot cause stresses in the machine which may affect accuracy.

Improved hydraulic carriage traverse and a pressure lubrication system that prevents oil pressure from lifting the carriage and affecting accuracy are features on the plain and universal grinders.

Another major improvement is a grinding wheel feed with a turning handwheel that shows the rate and amount of feed during the feed cycle.



Simplified headstock, wheel positioning cut setup time on chucking grinder

• **Surface Grinders** — A hydraulically operated unit (Model 618) can be equipped with hydraulic table traverse, hydraulic crossfeed, and powered wheelhead movement. Other surface grinders developed include the Hydrabrasive 1224 for precision work and a redesigned, Abrasive No. 1½, hand operated, precision unit for tool and die shop, toolroom, and job shop work.

For further information, *write* Landis Tool Co., Waynesboro, Pa. (Amphitheatre Booth 823.)

Variable Speed Drive on Punch Press Featured

A 65 TON, back geared, punch press (Model 65X) has been developed by Walsh. The unit has variable speed drive, large flange slide, air balancing unit, and one shot, grease lubrication. It's suitable for a speed range of 25 to 66 strokes per minute.

For further information, *write* Walsh Press & Die Co., 4709 W. Kinzie St., Chicago 44, Ill. (Amphitheatre Booth 1120.)

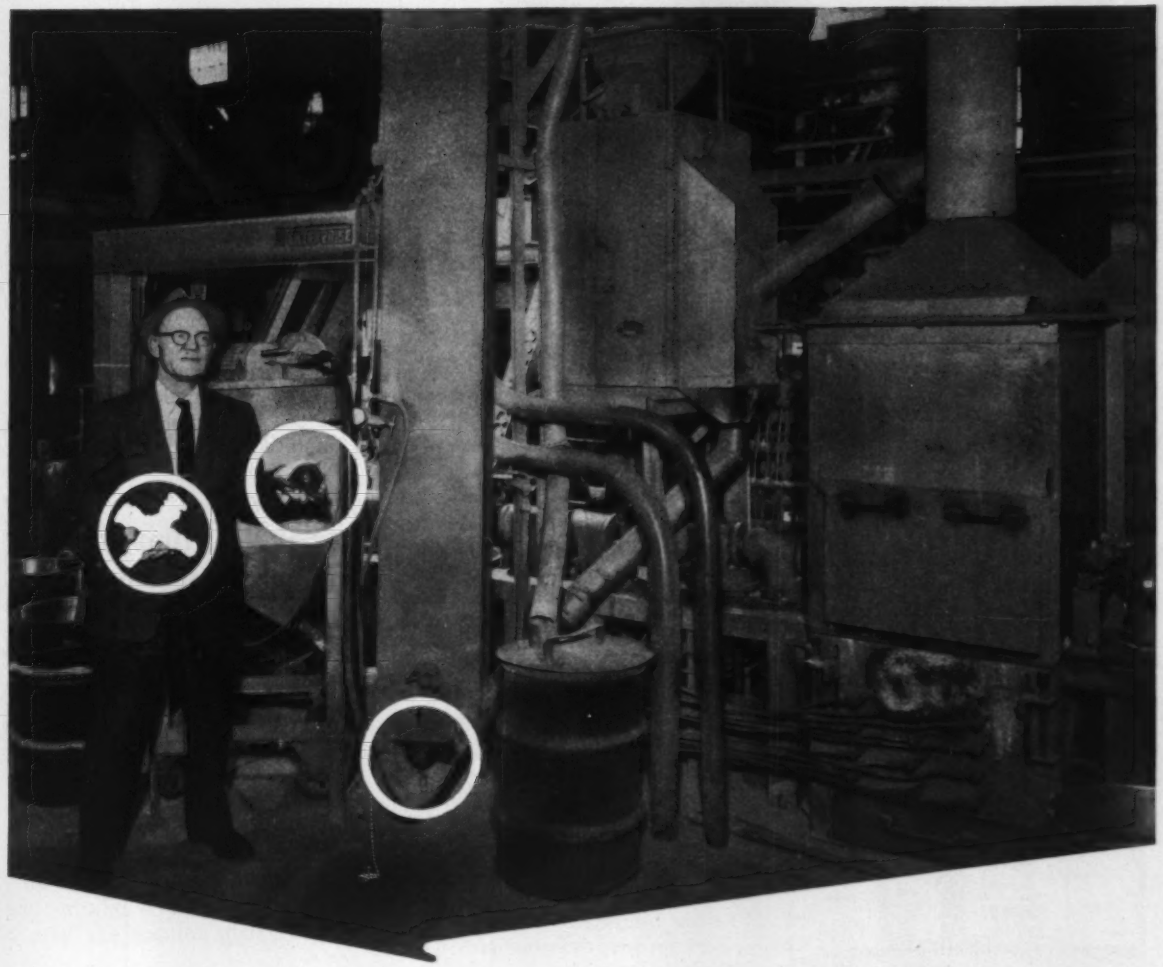
35 Ton Hydraulic Press Has Open Gap Design

A 35 TON hydraulic press is designed for trimming flash from die-castings. The open gap frame permits it to be used in light tonnage operation. The company says it's suitable for those operations requiring longer press strokes than available with inclinable mechanical presses.

It has rapid advance, slow draw, and rapid return, a large bed area, and a stress relieved, welded steel frame.

• **WELDING PRESS**—Other equipment includes a welding press measuring 126 by 126 in. It can hold large assemblies and weld them into unitized structures in a single operation. Single reduction gearing and quill-type clutch ease maintenance. Inclinable presses in the Big C Series are available in capacities up to 60 tons.

A rolling bolster press is equipped with a double bolster that moves back and forth through openings in the press frame. Dies are changed



Bearings, Inc. recommended a better seal, a better bearing and savings are $700.00 a year!

Here's a maintenance foreman who knew where to get help when bearings in his care failed prematurely. He called a Bearings, Inc. engineer when the bearings in this bucket elevator conveyor failed after only two weeks of use.

The Bearings, Inc. engineer found that the powdered zinc transmitted by the conveyor was responsible for the failure. Powdered zinc had worked through the bearing seal and since zinc joins itself when rubbed between two surfaces, being rubbed between the balls and bearing race led to a build-up that stopped the bearings in their tracks.

Analysis of loads and speeds showed a less expensive bearing would work well if its seal would shut out all dirt. The original bearings cost $16.79 each — the replacement only $7.36! This meant a net saving of $700 in bearing costs alone. Now in operation for two years the bearings have been replaced only once.

Bearings, Inc. sales engineers sell only products we are authorized to sell. No deals, no "just as good as" substitutes. Call the branch nearest you — The bearings you want are in stock ready for delivery.

Providing bearing service in the North → **BEARINGS, INC.**

DELAWARE: Wilmington • **ILLINOIS:** Neiman Bearings Co., E. St. Louis • **INDIANA:** Ft. Wayne • Indianapolis • Muncie • Terre Haute • **MARYLAND:** Baltimore • **MISSOURI:** Neiman Bearings Co., St. Louis • **NEW JERSEY:** Camden • Newark • **NEW YORK:** Bolanrol Corp., Buffalo • Niagara Falls • **OHIO:** Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Painesville • Toledo • Youngstown • Zanesville • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York • **WEST VIRGINIA:** Charleston • Huntington • Parkersburg • Wheeling

and

in the South → **DIXIE BEARINGS, INC.**

ARKANSAS: Little Rock • **FLORIDA:** Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge New Orleans • **N. CAROLINA:** Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville Memphis • Nashville • **VIRGINIA:** Norfolk • Richmond • Roanoke

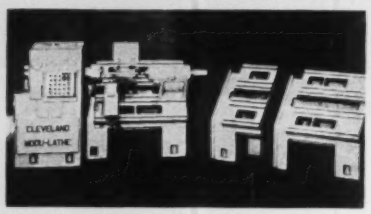
in one bolster while the press is producing stampings from the dies mounted in the other.

For further information, *write* E. W. Bliss Co., 1382 Raff Rd. S.W., Canton, Ohio. (Amphitheatre Booth 1325.)

Modular Units Combine to Produce Lathe Variations

THE line of Cleveland modular machines is a combination of components that unite with any one of four headstock combinations and six beds.

The machines that can be assembled include profile lathes for 180 and 270 degree configurations, turret lathes, pedestal lathes, automatic bar and chucking production lathes (with or without profiling), production lathes, and many other combinations. Bed lengths up to 140 in. are available.

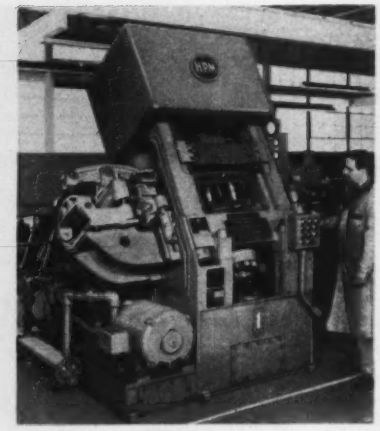


Introduced also is a hard tooth finishing machine for finishing gears after heat treating and hardening; a chipbreaker and tool booster that fragmentizes chips to desired size while lengthening cutting life; and data transcutter that translates data fed from photographs, drawings, templates, or tape into metal while normal machining is taking place.

For further information, *write* Cleveland Hobbing & Machine Co., a division of Textron Inc., 1311 Chardon Rd., Cleveland 17, Ohio. (Amphitheatre Booth 642.)

Triple Action Press Does Smooth Edge Blanking

A HYDRAULIC, triple action, blanking press and a Henry & Wright dieing machine have been announced by Hydraulic Press Mfg. Co.



Blanking press reduces burrs

The blanking press operates at speeds up to 120 strokes a minute. Equipped with a special die, it produces smooth edge parts. No shaving is necessary. Burrs are greatly reduced. Some parts may be used in assembly direct from the press. The unit operates with automatic roll feed or strip stock. Metal thickness and type of metal may be changed without press adjustment.

The Henry & Wright dieing machine has double crank construction. The standard press is equipped with roll feed, scrap cutter, motor driven cross-head adjustment, recirculating lubrication, and thermoswitches on all main bearings.

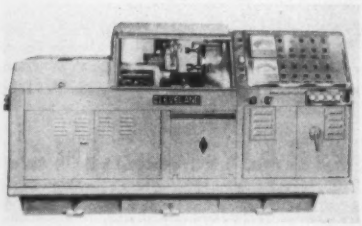
For further information, *write* Hydraulic Press Mfg. Co., a division of Koehring Co., Mt. Gilead, Ohio. (Amphitheatre Booth 1011.)

Speed Range Expanded on Single Spindle Automatics

SPINDLE speed range for the Cleveland, single spindle automatics has been expanded so that speed selections cover machining of all metals and all types of cutting tool.

Controls and adjustments have been designed to minimize change-over or setup time.

One unit, the 1⅝ in., Model AB Dialmatic, is a single spindle, automatic bar machine. It has ten, automatic, infinitely variable, spindle speeds for each cycle of the machine. Range: 40 to 3100 rpm. The 3 in., Model AB bar and chucking automatic features a feed monitor which indicates the exact feed for each turret position in inches per minute.



Other Cleveland units that have improved features include the 2½ in., Model AW, single spindle automatic and 1⅝ in., Model B, automatic shaft machine.

For further information, *write* Cleveland Automatic Machine Co., 4932 Beech St., Cincinnati 12, Ohio. (Amphitheatre Booth 900.)

Radial Drill Unit Has Improved Lighting System

THE Morris radial drill has been redesigned internally and externally. External electrical conduit is eliminated. The column clamp and unclamp buttons and a 110 volt accessory receptacle are flush mounted. A new positive displacement lubrication system is used.

It's available in 9 in. column, heavy duty size with 3 and 4 in. arms, in 11 in. column, heavy duty size with 3, 4, 5, and 6 in. arms, and in 9 in. light column size with 3 and 4 in. arms.

For further information, *write* Morris Machine Tool Co., 2015 Eastern Ave., Cincinnati 2, Ohio. (Amphitheatre Booth 1445.)

Tape Controlled Jig Borer Has 18 x 52 in. Table

A NUMERICALLY controlled, jig borer (Model 65) has accuracy to tenths with high traversing speed. Ultraprecision, linear transducers help obtain positioning accuracy.

The table and saddle are driven by hydraulic cylinders. The cylinders operate from balanced, closed hydraulic circuits which provide automatic, distortion free clamping.

Setups are fast and easy. The workpiece is located under the spindle by turning the micrometer dials of the zero offset. Rapid traverse for setup is controlled from pushbuttons. The control system emplovs low

(*Please turn to Page* 176)

ONE STOP FOR LATHES*

MMT-PE at the Machine Tool Exposition

NEW
4025
NK Design
Heavy Duty
Lathe

NEW
2516
NE Design
Heavy Duty
Lathe

NEW
2013
Numerically
Controlled
Lathe

NEW
2013
NE Design
Heavy Duty
Lathe

NEW
13"
Regal
Lathe

NEW
15"
Regal
Lathe

NEW
17"
Regal
Lathe

NEW
19"
Regal
Lathe

NEW
15"
Variable
Speed
Dual Drive
Lathe

NEW
6 PC
Crankshaft
Lathe

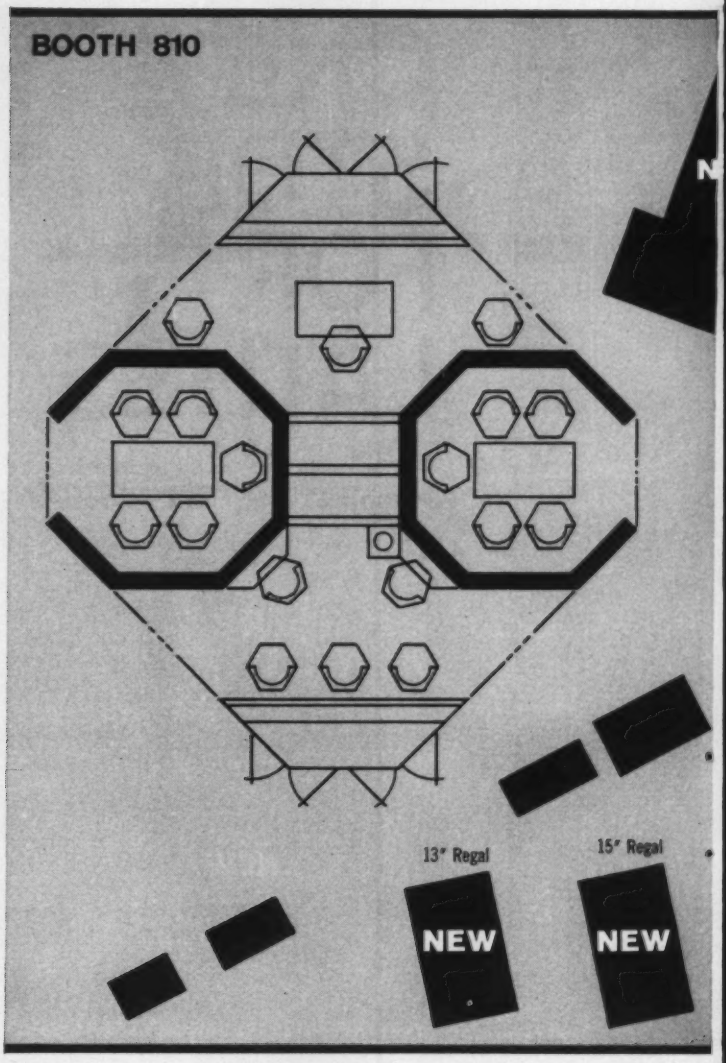
NEW Rapid Borer
Special 20" High Speed Lathe
and Other LeBlond Lathes

· SEE LEBLOND IN BOOTH 810 • SEE LEBLOND IN BOOTH 908 • SEE LEBLOND IN BOO

ONE STOP FOR LATHES

at the

Machine Tool Exposition



Wherever you find lathes—in production, maintenance, toolroom and classroom—you will find LeBlonds doing a magnificent job. LeBlond is the world's largest builder of a complete line of lathes.

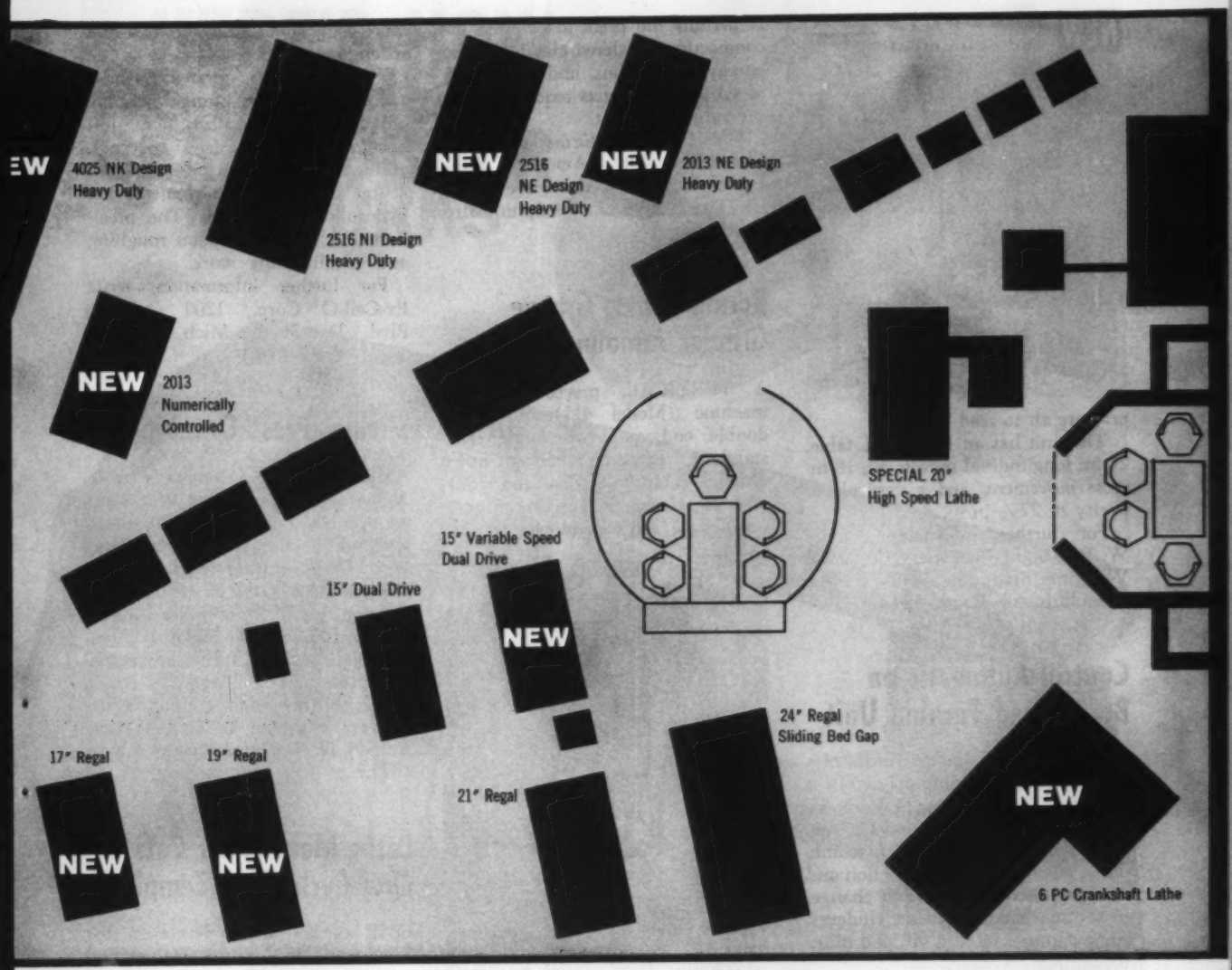
Choose the REGAL line for low priced lathes with big lathe features. These favorites for light production, maintenance, instrument work, training, and the toolroom are made in 15 different models from 13″ to 24″.

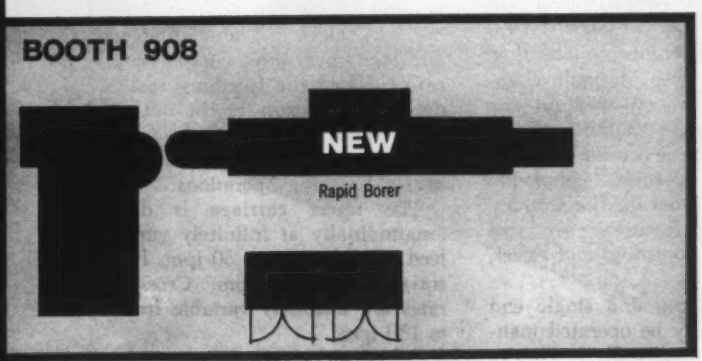
Look to the HEAVY DUTY line for rugged lathes for peak performance and round-the-clock production. The choice of production departments and tooling programs, LeBlond Heavy Duties are made in 6 different series from 13″ to 120″.

Rely on the RAPID PRODUCTION line for specialized small lathes designed for mass production of specific workpiece categories. Often used with form tooling, they are made in three different models.

LeBlond builds many of these fine lathes in toolroom, plain bed gap, and sliding bed gap models. They may be fitted with a full line of accessories, including *four* different tracers: Regal-Trace, Hydra-Trace, Two-Directional, and 90°, all made by LeBlond.

Sound engineering with ingenuity, three-quarters of a century of experience, a history of notable contributions to better lathe design—these are reason why we say, "With LeBlond, you cut with confidence!"





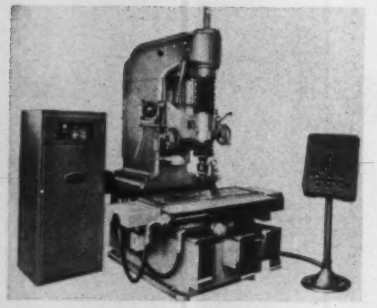
Cut with confidence

LeBLOND of Cincinnati

The R. K. LeBlond Machine Tool Company, Cincinnati 8, Ohio

I BOOTH 908 • SEE LEBLOND IN BOOTH 810 • SEE LEBLOND IN BOOTH 908 • SEE LEI

(*Continued from Page* 176)



pressure air to read tape.

The unit has an 18 x 52 in. table, 28 in. longitudinal movement, 18 in. cross movement, and a vertical capacity of 27½ in.

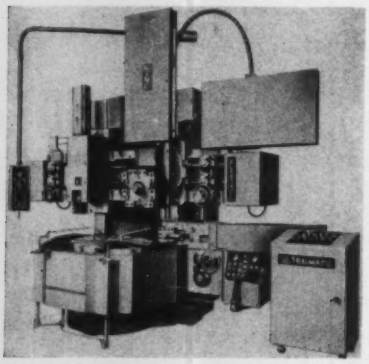
For further information, *write* W. B. Knight Machinery Co., 3920 W. Pine Blvd., St. Louis 8, Mo. (Amphitheatre Booth 824.)

Control Automatic on Boring and Turning Unit

COMPLETE automatic control of a full cycle of machining operations is provided by the King Ultramatic programing device on a 46 in., vertical, boring and turning machine. The cycle includes feed selection and change, speed selection and change, head movements, turret indexes, coolant pump on and off, and other machining functions.

Another development includes full electrical control of all machining functions from a convenient pendant station on Electrol machines. The units come in sizes from 30 to 168 in. and up.

Also announced is a timed compression and decompression cycle on a 1000 ton, Elmes hobbing press.

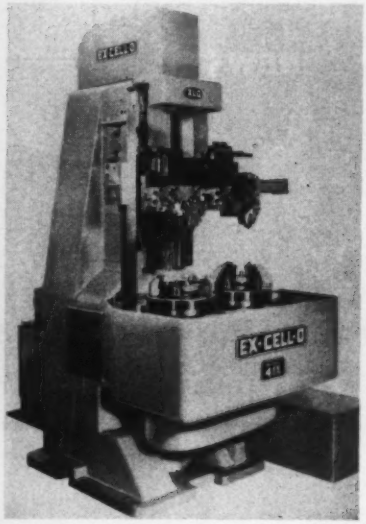


It permits the press to be used for compacting powdered metals, atomic energy applications, and production of synthetic products requiring high pressures and heat.

For further information, *write* Elmes/King Div., American Steel Foundries, 1156 Tennessee Ave., Cincinnati 29, Ohio. (Amphitheatre Booth 1406.)

Boring Units, Groove Grinder Announced

A VERTICAL, precision boring machine (Model 411), and two double end and two single end, standard, precision boring units (Models 731, 732, 751, and 752) and the Model 973 groove grinder are among units developed by Ex-Cell-O.



Seven arrangements of components are possible on this vertical boring unit

Model 411 does precision turning, boring, facing, grooving, and chamfering operations on medium size parts. It has single column construction, comes with a counterbalanced, hydraulically operated, compound slide. It's mounted on the column. The machine features easy tool changing and adjusting, and easier, safer loading.

The double end and single end boring units may be operated manually or automatically. They're adaptable to point-to-point numerical control or to an automatic line. They have temperature controlled hydraulic panels, redesigned bases, more rigid tables, and relocated and redesigned table stops.

The precision groove grinder (Model 973) does plunge grinding on parts of various sizes. The unit has variable wheel feed, sparkout, and withdrawal controlled by cam action. Cross slide movements are hydraulically operated. The precision unit can be used on roughing and semifinishing work.

For further information, *write* Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. (Amphitheatre Booth 946.)

Shears, Press Developed

AMONG the developments from Niagara Machine & Tool Works are an overdrive, power squaring shear with an 18 in. gap, ½ in. capacity, and 144 in. cutting length; a mechanical sleeve clutch, OBI press (equipped with forming die); a 400 ton, hydraulic press brake, and an ultrahigh speed, fully automatic OBI press.

For further information, *write* Niagara Machine & Tool Works, Buffalo, N. Y. (Amphitheatre Booth 1330.)

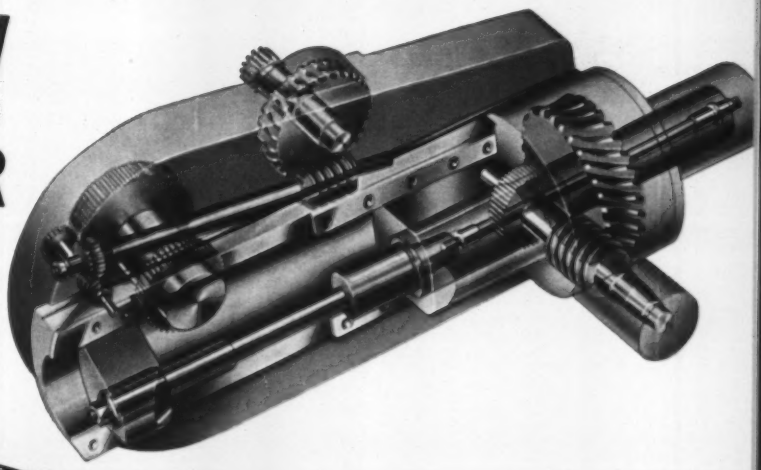
Lathe Makes Four Cuts in One Cycle from Template

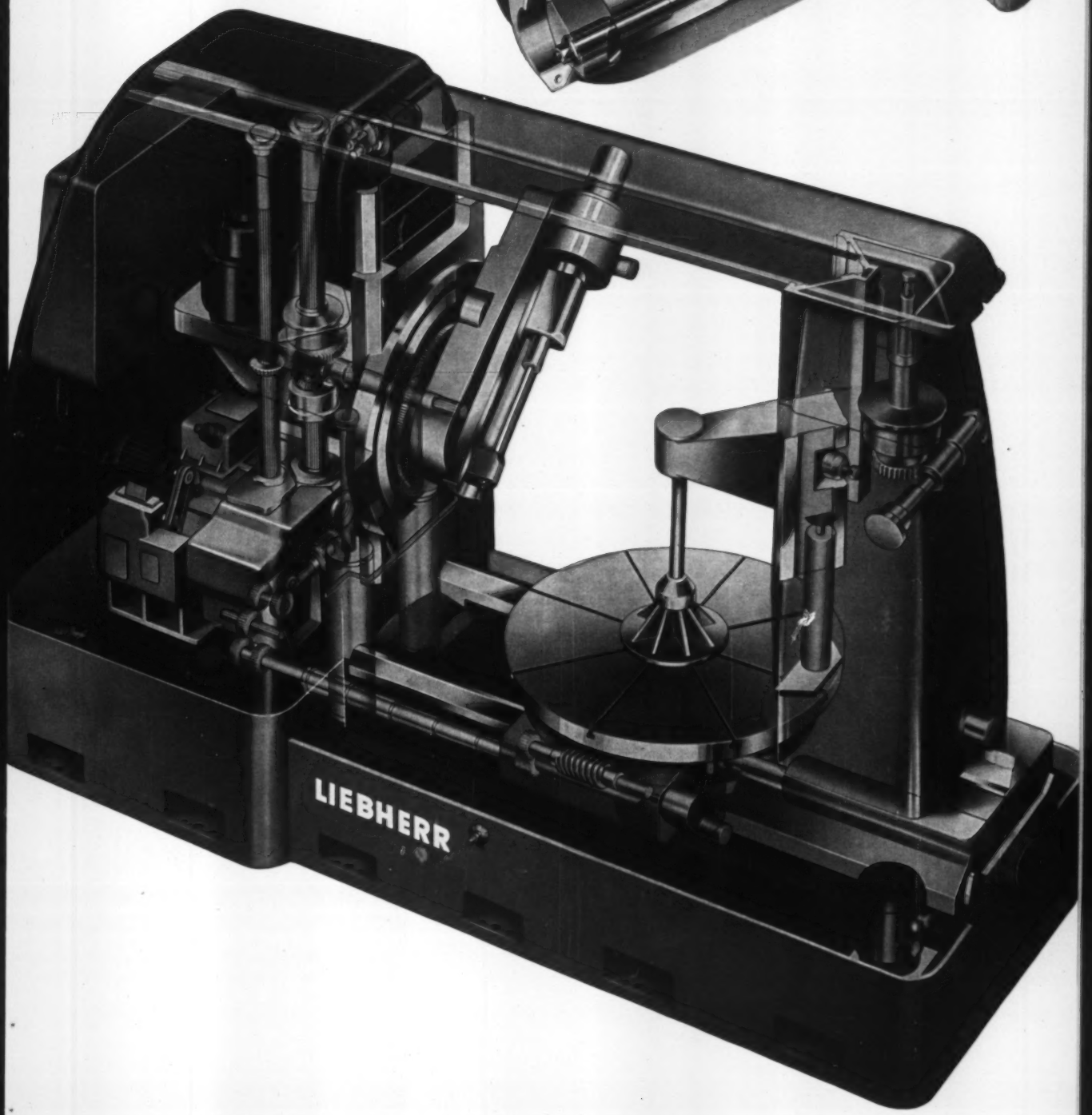
ONE of the units developed by Sundstrand is a multicycle tracing lathe (Model 1425T). In a single automatic cycle from one template, three ruffing or semifinishing cuts and one finishing cut can be made. The ruffing and finishing tools are mounted on a two position, indexing tool block. The ruffing tool will take up to three cuts automatically. Then the finishing tool indexes into position for the finishing cut. The company says the feature may eliminate the need for grinding or finishing operations.

The tracer carriage is driven longitudinally at infinitely variable feed rates from 4 to 50 ipm. Rapid traverse rate is 180 ipm. Cross feed rates are infinitely variable from 1 to 180 ipm.

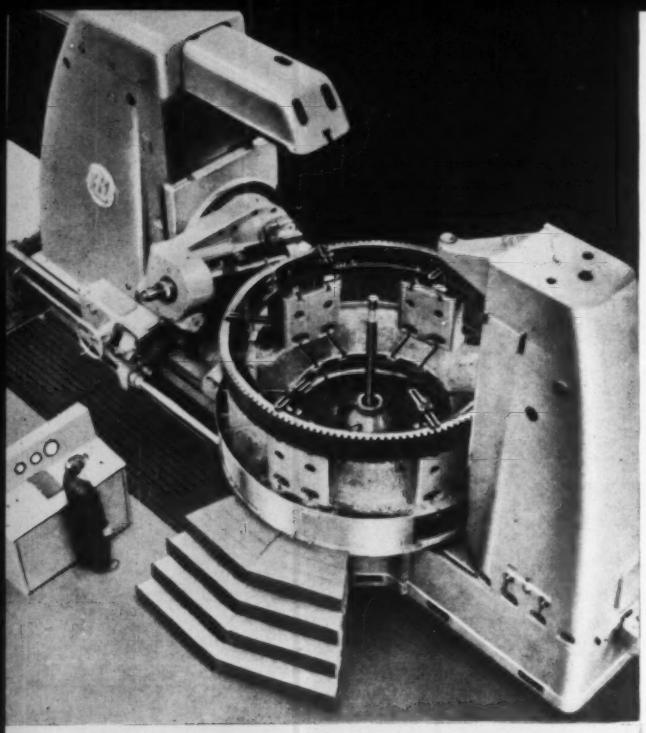
Other units include a multitool production lathe (1425-M); a three axis, numerical control machine (Model 21); a multiple spindle, precision drilling, boring, reaming, and

HERE'S HOW THE LIEBHERR GEAR HOBBER WORKS





to see it at work—turn the page.....



Hobbing a helical ring gear on Model L-3200

Did you spot these gear hobbing features on the preceding page?

They're all yours—only in a LIEBHERR

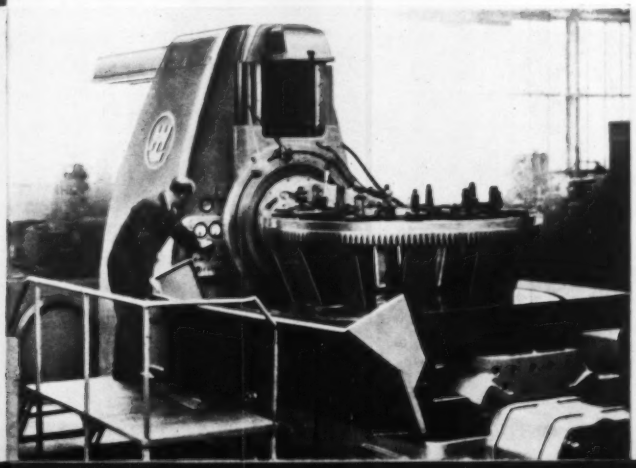
1 **WARD-LEONARD AC-DC MAIN DRIVE** provides infinitely variable hob speeds with maximum torque and highest cutting efficiency at all operating speeds.

2 **SHORTEST AND MOST DIRECT DRIVE FROM MAIN MOTOR TO HOB SPINDLE** delivers 70% of motor's power to hob where it is needed most.

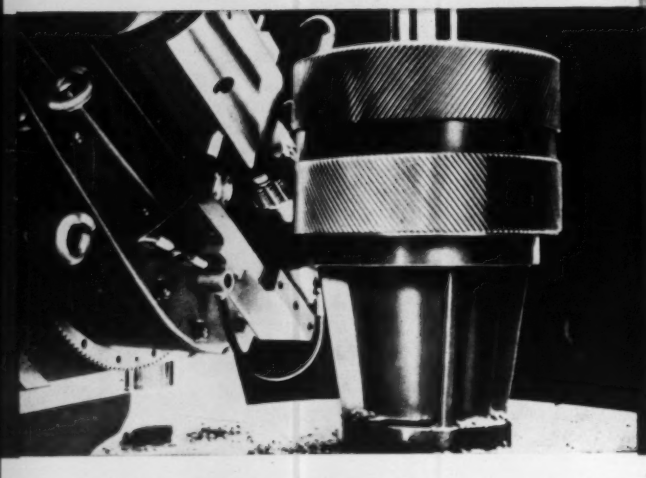
3 **BALANCED HOB SLIDE DESIGN**—main motor acts as counterbalance to hob slide.

These are just a few highlights of the advanced design that distinguishes LIEBHERR GEAR HOBBERS and explains why they are in the forefront of production gear hobbing—here and abroad. There are a dozen more reasons—every one illustrated in detail in our 36-page catalog. We think you'll be interested in evaluating every one of them in terms of your present or projected gear cutting procedures. May we send you a copy?

Ten Liebherr models range from 12" to 150" diameter



Hobbing a radar rim gear on Model L-1800



KO CO. INC. PRECISION MACHINERY

KURT ORBAN

COMPANY, INC.

34 Exchange Place, Jersey City 2, New Jersey

F 1002 200 4.60 Ja

Printed in Western Germany

NEW PRODUCTS and equipment

Maker says grinding and finishing may not be needed after cuts on this lathe

tapping unit; Model T3, vertical, three way, broaching machine; a 15 hp, vertical knee type, milling machine; a universal, automatic, thread milling machine; and a rotary surface grinder.

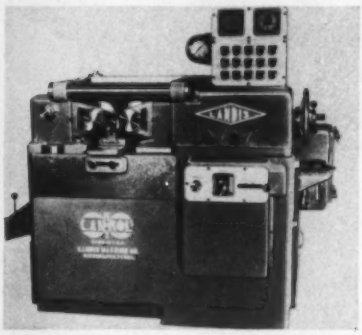
For further information, *write* Sundstrand Machine Tool Div., Sundstrand Corp., Belvidere, Ill. (Amphitheatre Booth 1014.)

Thread Rolling Machines Handle Rods, Headed Parts

TWO thread rolling machines have been developed by Landis. One unit, the Lanhyrol, has a diametrical range of 0 to 3 in. and is designed to automatically thread and knurl in one pass. Production rates go up to 100 completed parts (threaded and knurled) per minute.

The unit is automatic and only requires visual inspection. In operation, a vibratory hopper feeds parts down an inclined chute to the machine's indexing work rest. The work rest is timed to index a blank into rolling position as the preceding blank is ejected.

The other unit, the Lan-nu-rol,



Thread rolling unit automatically threads and knurls in one pass

has a 2 in. maximum infeed rolling capacity and a 1 in. maximum throughfeed rolling capacity. The rod feeder and receiver unit are designed to allow automatic throughfeed rolling of rod length stock.

Operation: The stock is loaded in the feeder magazine and the lengths are ejected onto the feeder. An air operated pusher mechanism starts the stock between the thread rolls. When the stock is thread rolled through the unit to a predetermined point, the next blank is loaded. Units can be supplied for handling rod lengths up to 20 ft.

For further information, *write* Landis Machine Co., Waynesboro, Pa. (Amphitheatre Booth 432.)

Capacity of Face Mill Grinder Given Boost

THE new version of the Oliver, automatic, face mill grinder (Model 624) has increased capacity and will take work from 6 to 24 in. in diameter. New tooth forms can be ground including the periphery of the cutter. Dressing, grinding, indexing, upfeed, and roughing and finishing cuts are automatic.

Other units include the Model 600 drill pointer (½ to 3 in. capacity) and the heavy duty, No. 21, drill pointer (3/32 to ½ in. capacity).

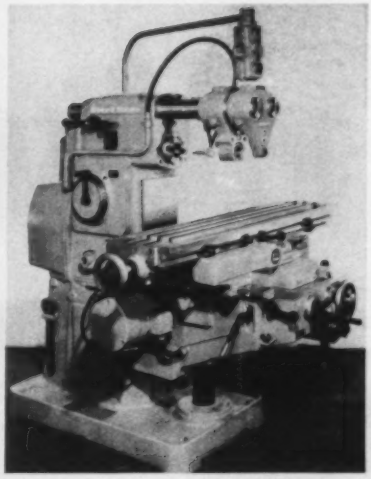
For further information, *write* Oliver Instrument Co., Adrian, Mich. (Amphitheatre Booth 342.)

Precision, Productivity Stressed in Tools

AMONG Brown & Sharpe developments are a line of No. 2 milling machines (plain, universal, and vertical units) of 3, 5, and 10 hp capacity. New Rangemasters (sliding head type, milling machines) are equipped with automatic cycle, rise and fall of the knee, and backlash eliminator.

Table working surface has been increased to 13 x 55 in. and the vertical travel has been increased on 3, 5, and 10 hp models. The units use the building block principle and can be furnished in 132 different combinations.

Other developments include a col-



umn for a deep hole drilling unit; a tape controlled, cam milling machine (the Numericam); 8 x 24 in. and 10 x 30 in. grinding machines; a No. 5, plain grinding machine with Ceda/Size equipment; the No. 618, Micromaster, slicing and dicing machine; a grinding machine headstock; a universal trunnion fixture; and accessories for automatic and hand screw machines.

For further information, *write* Brown & Sharpe Mfg. Co., 250 Promenade, Providence, R. I. (Amphitheatre Booth 452.)

Double End Boring Unit Features Fast Setups

HOLES that are round within 0.000020 in. can be bored simultaneously from both directions with the Pope Model 10-6, double end, horizontal, precision boring unit.

The machine has two moving heads and an electric programer for fast production and setups. The programer can initiate a synchronized start for the two heads (which then run independently), a completely independent cycle for each head, or movement of one head triggered at any predetermined point of the other head's cycle. It also controls rapid traverse, fine feed rate, dwell time, rapid traverse reverse, coolant flow, auxiliary components, and automatic clamping of parts when desired.

Boring heads are dynamically balanced to 25 millionths with all rotating parts in full assembly. The spindles may be driven by sizes and

(*Please turn to Page* 182)

AT DEVLIEG BOOTH 431 • NMTBA EXPOSITION

new series

"Designated the model 'H,' our new Jigmil series provides greater range, is more rugged, easier to operate and more accurate."

"Available in spindle sizes ranging from 3" to 5", the new 3H, 4H and 5H machines greatly increase JIGMIL range for precision boring, milling, drilling and other operations. The new series introduces simplified controls, thermal control of main spindle bearings for increased accuracy . . . wider bed and table for added stability and working range . . . stainless steel way covers for positive protection . . . features that reach a new standard in JIGMIL accuracy, ruggedness and simplicity of operation. And like all JIGMILS, the 'H' series is available with the DeVlieg Diatrol direct dial dimensioning system or Tapac* —DeVlieg's own system of automatic tape control."

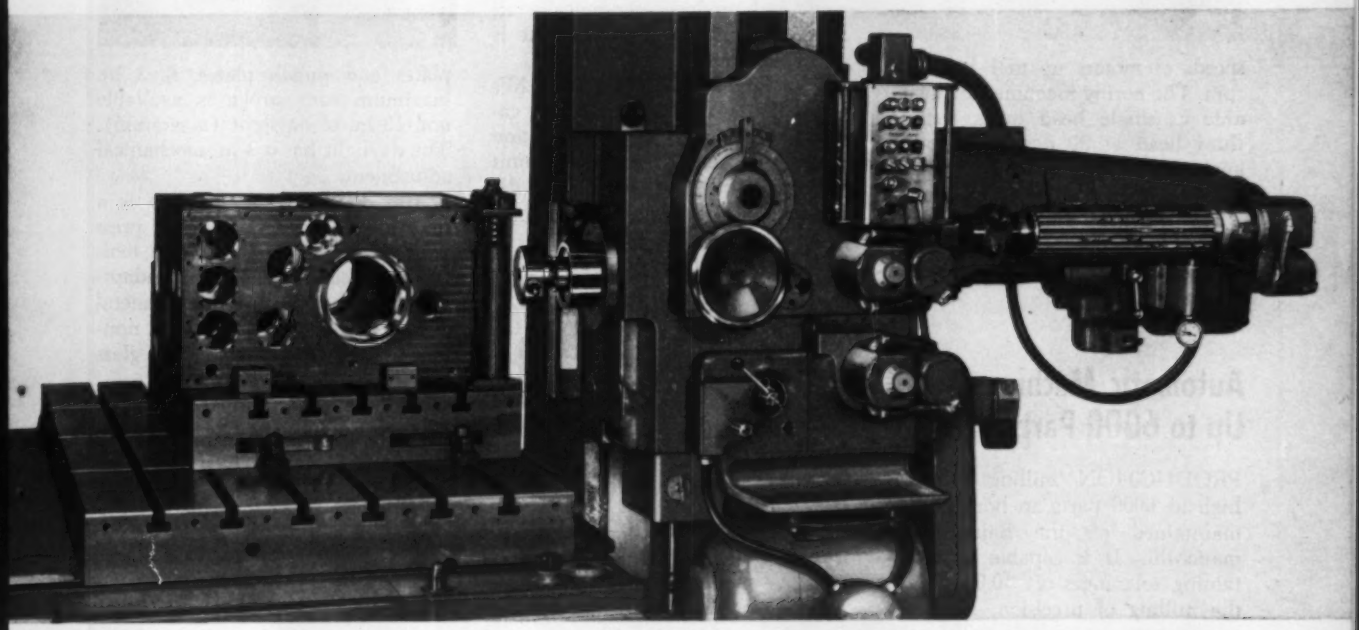
R. A. JERUE
Vice President in Charge of Engineering

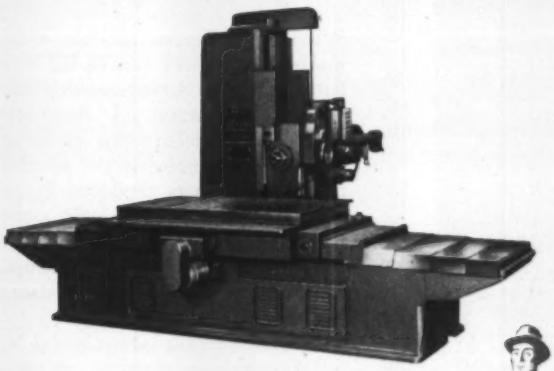
**Tape Automatic Positioning And Control*

DEVLIEG MACHINE COMPANY, FAIR STREET • **ROYAL OAK, MICHIGAN**

"H" Jigmils®

with Duplitrol • Diatrol • Tapac





Rewarding revelations in automatic precision await your next visit to Fair Street

MMT-PE

See new "H" series JIGMILS with DeVlieg Diatrol and DeVlieg Tapac in operation at the NMTBA Exposition, Chicago, September 6-16th.

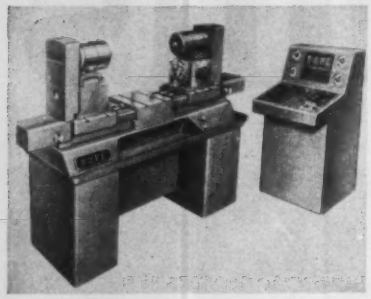
Also, see in operation the new Micropoint Precision Tool Grinder—first grinder capable of absolute control of tool geometry.

DeVlieg

SPIRAMATIC JIGMILS®

ACCURATE HOLES AND FLAT SURFACES IN PRECISE LOCATIONS

(*Continued from Page* 179)



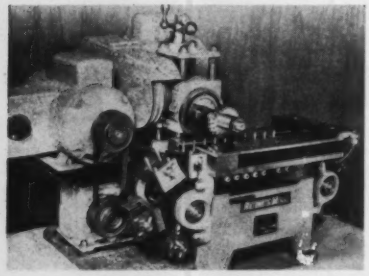
speeds of motors up to 1 hp, 3600 rpm. The boring machines are available as single head units, with a third head at 90 degrees or other angles, or with four heads at 90 degrees or other angles.

For further information, *write* Pope Machinery Corp., 261 River St., Haverhill, Mass. (Amphitheatre Booth 482.)

Automatic Machine Mills Up to 6000 Parts an Hour

PRODUCTION milling rates as high as 6000 parts an hour can be maintained on the Baird AutomaticMill. It is capable of maintaining tolerances of ±0.001 in. in the milling of precision, electronic components as small as 0.050 x 1/4 in. and tool bits as large as 1 in. square.

In operation, the chain drive continuously moves as parts to be milled are inserted by hand or are automatically hopper fed into the jaw cavities. The jaws are attached to carrying bases which are accurately located in the ways by heavy, spring loaded bearings. The jaws (individual units) firmly hold the parts in the jaw cavities as they pass beneath the cutter and are milled. After releasing the machined parts,



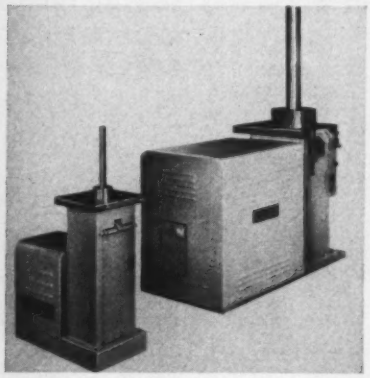
air wipers remove dirt and chips from the bases and jaws before reentry into the ways.

For further information, *write* Baird Machine Co., 1700 Stratford Ave., Stratford, Conn. (Amphitheatre Booth 1142.)

Units Cut Keyways, Splines, Die Profiles

TWO, keyseater, vertical cutting units are designed to do quality work and produce economically on short run jobs where setup time is a constant requirement.

The larger keyseater (M & M's No. 6 hydraulic) has a cutting capacity of 3½ x 30 in. In addition to cutting internal keyways, the unit will cut splines, serrations, and die



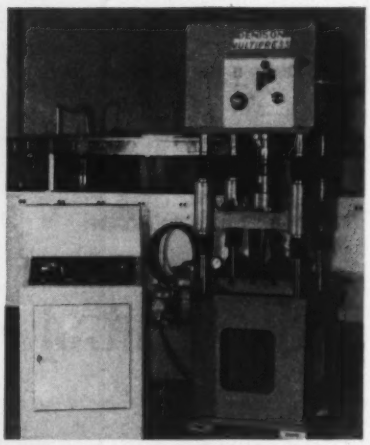
profiles (internal and external) with simple fixturing. The smaller unit (Model No. 1) is mechanically operated and has a cutting capacity of ¾ x 8 in.

For further information, *write* Mitts & Merrill Inc., 1009 S. Water, Saginaw, Mich. (Coliseum Booth 320.)

High Speed Press Rated at 25 Tons

A 25 TON, hydraulically operated, servo driven press can cycle over 600 strokes per minute with variable stroke lengths of 1/4, ½, ¾, 1, 1½, 2, and 3 in. Stroke lengths can be changed easily while the machine is cycling. Special ram strokes are possible by changing the harmonic cams on the cam driveshaft.

Distance between guideposts is 20 in. left to right and 20 in. front to back with optional choices of bolster



plates and punch plates. A 3 in. maximum ram stroke is available and 13 in. of daylight (maximum). The daylight has a 3 in. mechanical adjustment.

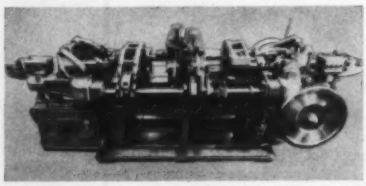
Also developed by Denison is a floor model, metal compacting press with a 1 ton capacity. With tooling modifications, the press is adaptable to a variety of powdered metal compaction operations (ferrous, nonferrous, and exotic metals) and glass and plastic compaction.

For further information, *write* Denison Engineering Div., American Brake Shoe Co., 1186 Dublin Rd., Columbus 16, Ohio. (Amphitheatre Booth 914.)

Double Ended Unit Makes Stampings at Each End

WITH the Duplex double ended machine, coil stock can be fed in at both ends. The arrangement is suited for fabrication of assemblies which could include two stampings made and assembled in the machine or two stampings produced in the machine and assembled with a prefabricated, hopper fed member. The equipment can be used for simultaneously making different stampings not requiring assembly.

The one size available (Model No. 36D) can take material up to 3 in. in width and a feeding length adjustable up to a maximum of

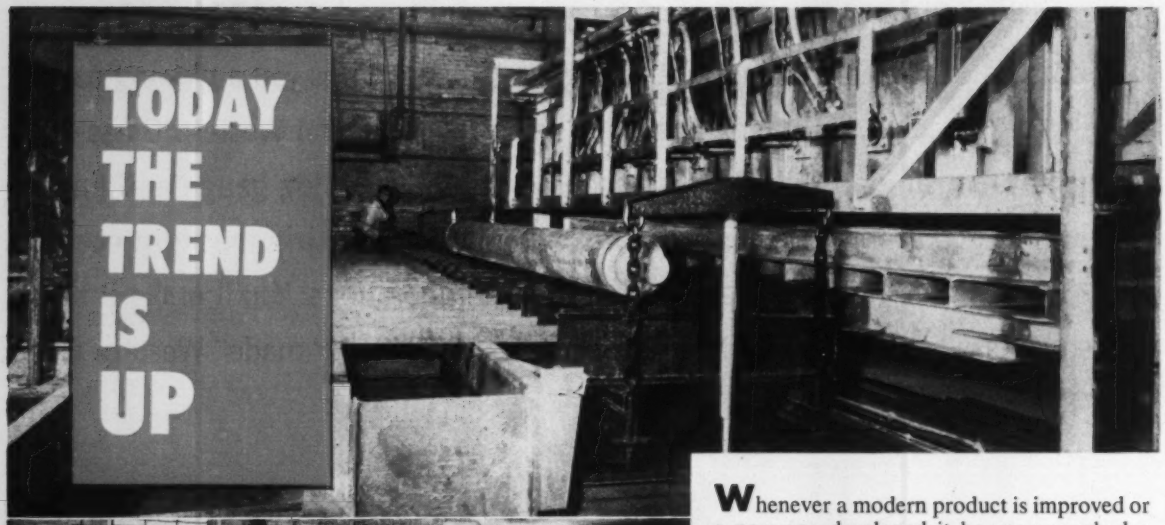


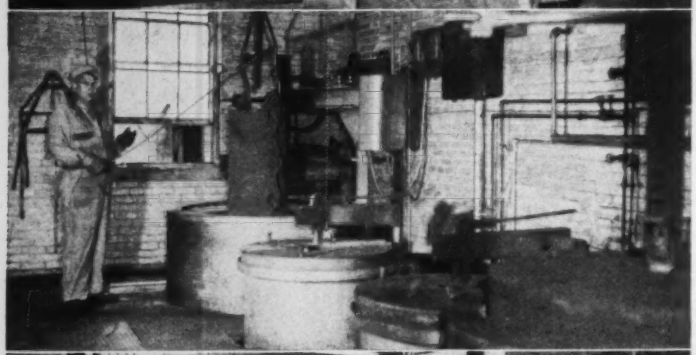
You'll make a better impression with **Western Brass**...because, tough as it is, ductile solid brass is perfect for coining, embossing or stamping, gives you a glowing natural finish, takes gracefully to buffing or plating when required. And Western Brass—with its uncompromising attitude towards accuracy of temper, alloy, gauge and finish—produces a broad range of copper base alloys in sheet and strip that turn even the most critical of stamping procedures into routine operations. You'll make it better with solid, easy-to-stamp brass. You'll make it best with "tailor-made" Western Brass.

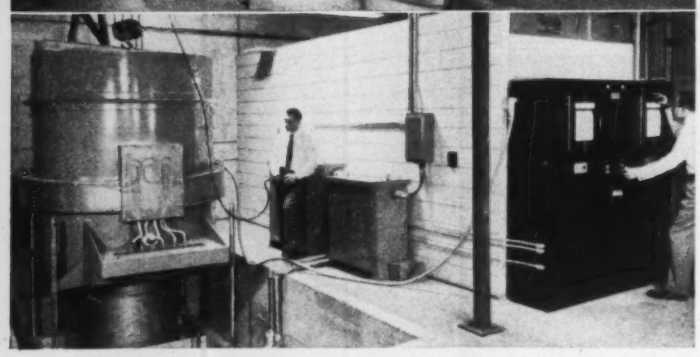
Olympic medals were stamped out of Western strip. For the recent Olympic Winter Games, third-place medals, all three thousand commemorative medals, and the centers of all first-place gold medals were made of Western Commercial Bronze.

OLIN MATHIESON • METALS DIVISION • EAST ALTON, ILL., NEW HAVEN, CONN.

Western. BRASS







Consult your Commercial Heat Treater about your design or specification problem.

Whenever a modern product is improved or a new one developed it has now reached a point where the heat treating procedures and processes to be applied to basic component parts are among the original factors to be considered. In the past, fabricating methods and metals were frequently the first to be specified and heat treating, if involved at all, was a secondary problem.

Because of this and because of the new and exceptional design characteristics and ultimate engineering properties which can be achieved only through skillful and accurate heat treating, the tonnage volume of heat treating materials processed by the commercial heat treating industry grows steadily month after month.

There is another reason for this and it is found in the fact that only the commercial heat treater offers practically an all inclusive diversity of plant facilities, but even more important, the accumulation of technical skills, experienced personnel, and the background of knowledge so essential to this field.

If you would like to receive a charted monthly report of the volume of activity in this industry, write us on your company letterhead. We will be glad to send it to you.

Whatever your heat treating problem, always check with your commercial heat treater first.

AMERICAN METAL TREATMENT CO.
Elizabeth, New Jersey
BENEDICT-MILLER, INC.
Lyndhurst, New Jersey
BENNETT HEAT TREATING CO., INC.
Newark 5, New Jersey
COMMERCIAL STEEL TREATING CORP.
Detroit 4, Michigan
COOK HEAT TREATING CO. OF TEXAS
Houston 11, Texas
DAYTON FORGING & HEAT TREATING CO.
Dayton 3, Ohio
DOMINY HEAT TREATING CORP.
Dallas, Texas
FRED HEINZELMAN & SONS, INC.
New York 13, New York
ALFRED HELLER HEAT TREATING CO., INC.
New York 38, New York
IPSENLAB OF ROCKFORD, INC.
Rockford, Illinois
PAULO PRODUCTS CO.
St. Louis 10, Missouri
PITTSBURGH COMMERCIAL HEAT TREATING CO.
Pittsburgh 1, Pennsylvania
QUEEN CITY STEEL TREATING CO.
Cincinnati 11, Ohio
J. W. REX CO.
Lansdale, Pennsylvania
THE STANLEY P. ROCKWELL CO.
Hartford 12, Connecticut
SCOTT FORD, INC.
Rock Island, Illinois
SYRACUSE HEAT TREATING CORP.
Syracuse 3, New York
TEMPERATURE PROCESSING CO., INC.
North Arlington, New Jersey

CANADA: IPSENLAB OF CANADA LIMITED, Toronto 16, Ontario

6 in. It can be equipped with an extra die head (ram) at each end, cutoff slide at each end, and rear auxiliary slide at each end.

For further information, *write* U. S. Tool Co. Inc., Ampere (East Orange), N. J. (Amphitheatre Booth 842.)

Grinder Has 3000 Ampere Electrolytic Power Unit

THE Thompson grinder is equipped with a 3000 ampere, Anocut, electrolytic power unit and an 18 in. diameter, 2⅛ in. wide, nondiamond, metal bonded, grinding wheel. It has a diamond dressing shoe for forming 16 pitch, 90 degree serrations in the periphery of the 18 in. diameter wheel.

A table speed from 1 in. to 75 ft per minute permits grinding by electrolytic or conventional methods. The unit can use the 2⅛ in. (thick) wheel for serration grinding on the periphery or a 5 in. width of the wheel for face grinding operations (using the side of the wheel).

The unit can grind the exotic materials with a nondiamond, metal bonded wheel which eliminates residual stress in the material being ground. For grinding carbides or combinations of carbide and steel, a diamond, metal bonded wheel is used. The unit can handle grinding wheels in sizes from 10 x 5 x 2 in. up to 20 x 8 x 4 in.

Another Thompson development is the Cybermatic pendant control which eliminates the hand wheel for elevating the wheel head on the Type CX Plunge-Matic grinder.

For further information, *write* Thompson Grinder Co., Springfield, Ohio. (Amphitheatre Booth 850.)

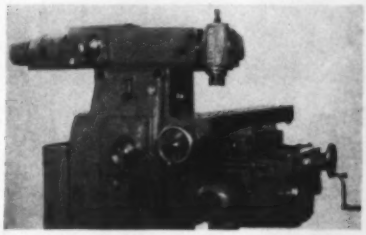
Hobbing Machine Handles 12 in. Diameter Gears

GEARS up to 12 in. in diameter can be hobbed by the Lees-Bradner Model 12HD, single spindle, vertical, hobbing machine (12 x 20 in.). The unit has all the features of the Model 7HD. A new hob head has been developed for both machines. A lead differential mechanism is available for the 12HD. It's called the Dial-it, 3½ in., electric hob shifter.

For further information, *write* Lees-Bradner Co., Elmwood & Thomas Avenues, Cleveland, Ohio. (Amphitheatre Booth 481.)

Motorized Ram Designed For Mills in Field

A MOTORIZED ram (for the Kempsmith Master-Mill) can be equipped with vertical and universal head attachments for angular, multiple surface, vertical, and horizontal milling.



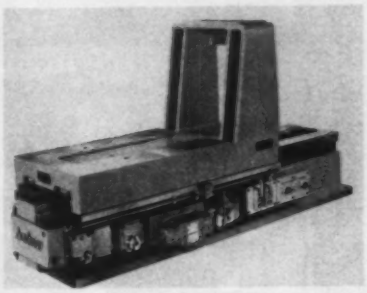
It's driven by a 3 hp motor with the electrical controls at the front and rear of the machine. It has a dial selector, speed change mechanism with eight changes and ranges of 50 to 2250 rpm, a No. 50 National Standard taper, wormwheel adjustment, pressurized lubrication system (oil), and an electric magnetic brake. The unit can be adapted to any Master-Mill.

For further information, *write* Kempsmith Machine Co., 1853 S. 71 St., Milwaukee 14, Wis. (Amphitheatre Booth 347.)

Units Built to Special Machine Tool Standards

EQUIPMENT, built to the new Special Machine Tool Standards, has been designed for machining tractor transmission housings weighing about 150 lb each. Features: A 60 per cent increase in rapid traverse rate, a compact hydraulic power package, and a 50 per cent increase in structural strength.

Panel mounted controls include plug-in limit switches; a five position, color coded shifter for the valve spool; and a piggyback, solenoid, pilot, pressure valve which operates



the main spool for rapid advance and return.

For further information, *write* Buhr Machine Tool Co., 835 Green, Ann Arbor, Mich. (Amphitheatre Booth 1440.)

Contour Saw Equipped With 24 x 28 in. Table

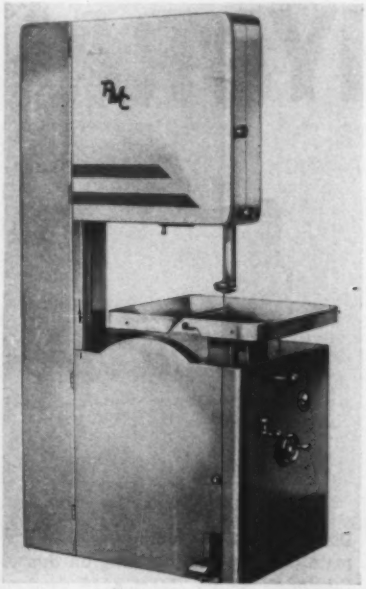
HARDENED saw blade guides on the Peerless contour saw (Model 2600) are replaceable and can be adjusted for blades from 1/16 to ½ in. wide. The metal saw has a 26 in. throat capacity and a 15 in. height capacity.

It's equipped with an infinitely variable speed drive (from 50 to 6000 fpm) controlled by a tachometer. The 24 x 28 in. table is adjustable 10 degrees left and 45 degrees right.

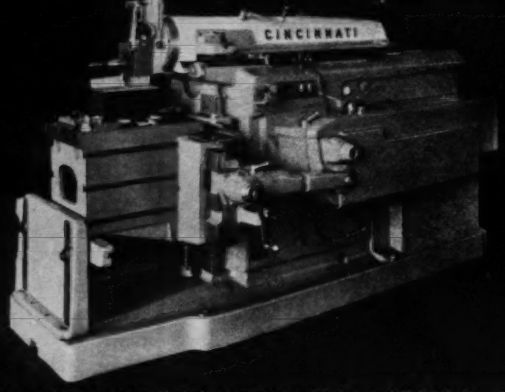
An air stream keeps chips away from the work. It accommodates a maximum blade length of 187½ in. and a minimum length of 180 in.

Another unit, the carbon blade

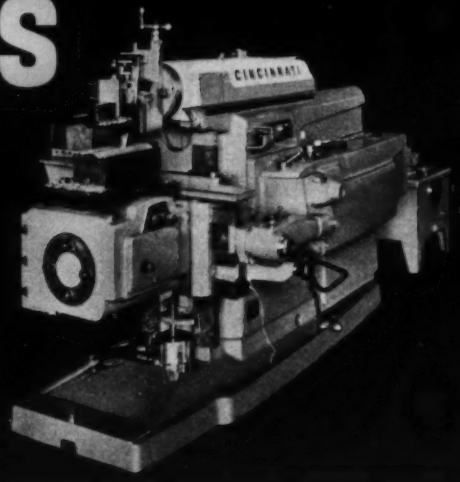
(*Please turn to Page* 188)



RIGID SHAPERS

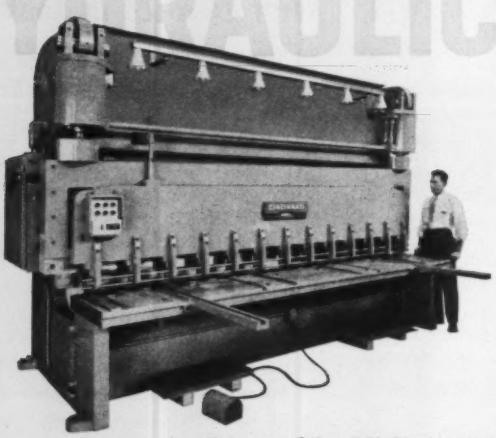


Fast and accurate metal removal will be exhibited by the Cincinnati 24" Rigid Shaper—see it cut 2" deep at .030" feed.

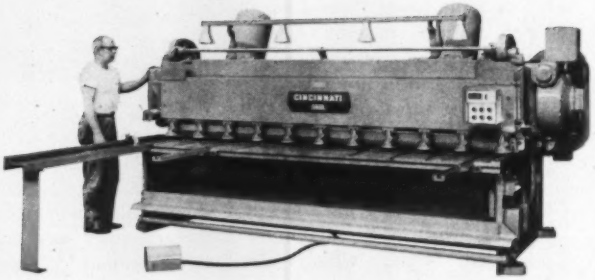


This 16" Cincinnati Duplicating Shaper demonstrates automatic tracing from a simple sheet metal template.

HYDRAULIC AND MECHA

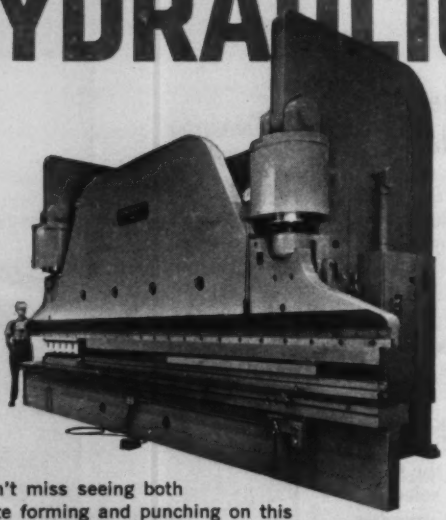


This new ⅝" x 12' Cincinnati Hydraulic Shear, with adjustable rake from 0" to ¾" per foot, will cut from relatively thin sheets up to ¾" mild steel plate.

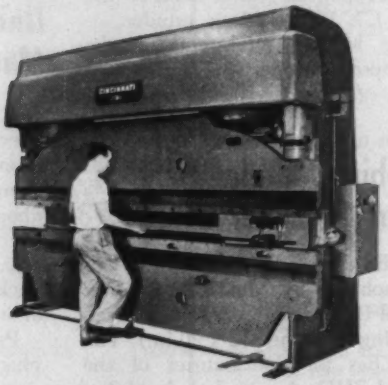


Check the fast, accurate sheet shearing performance of this Series 1410 Cincinnati Shear (3/16" x 10' mild steel capacity) equipped with a magnetic sheet support.

HYDRAULIC AND MECHA



Don't miss seeing both plate forming and punching on this Cincinnati Series 750-H x 16' Hydraulic Press Brake. Fast set-up, long stroke and deep throat make it especially profitable for fabricators who produce varied shapes in plate.



The 3 Series x 10' Cincinnati Press Brake, 75 tons near bottom of stroke, has all the Cincinnati refinements: all-steel construction, centerline loading, rigid, micro-crowned bed and ram, motorized ram adjustment plus many other features.

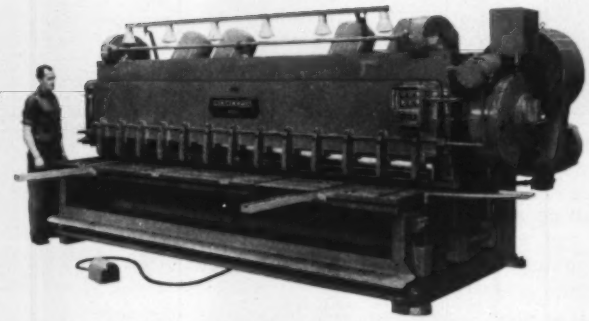
All in action at

THE CINCINNATI SHAPER CO.

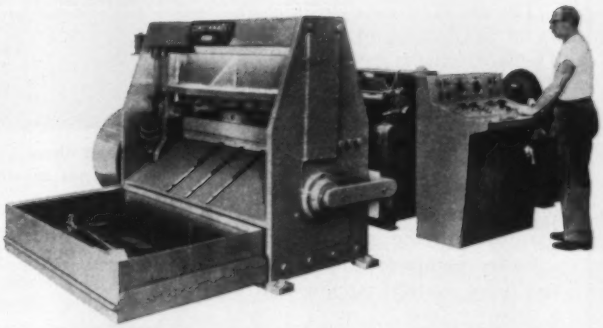
BOOTH 1230

Machine Tool Exposition—1960, Chicago, International Amphitheatre, September 6-16

NICAL SHEARS

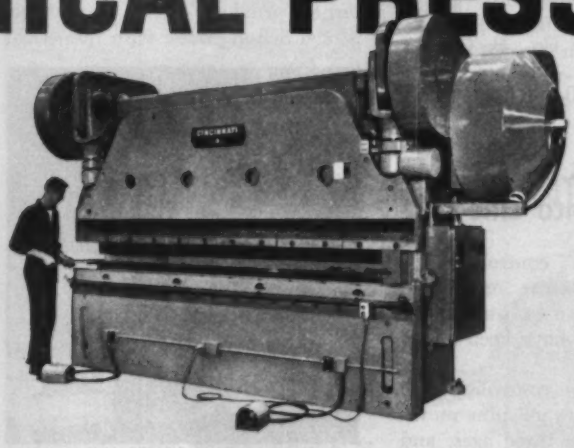


Speed up your plate cutting jobs with Cincinnati mechanical plate shears, represented by this Series 4312 Cincinnati Shear (½" x 12' mild steel capacity).



See this new Cincinnati Hi-Speed Shear cut 18 ga. x 24" coiled stock at 200 strokes per minute. Used in conjunction with automatic coil-feeder-straightener.

NICAL PRESS BRAKES



The new 225 ton, 9 Series x 10' Cincinnati Automatic Cycle Press Brake demonstrates high-speed sheet metal forming without "clutch-slipping," "whip-up" or "back-bends." See the first real solution to high speed production with automatic bending action.

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow

NEW PRODUCTS and equipment

(*Continued from Page* 185)
bandsaw (Model 610) has a capacity of 6 x 10 in. and is powered by a ½ hp, 110 volt motor. It's equipped with wheels and handles.

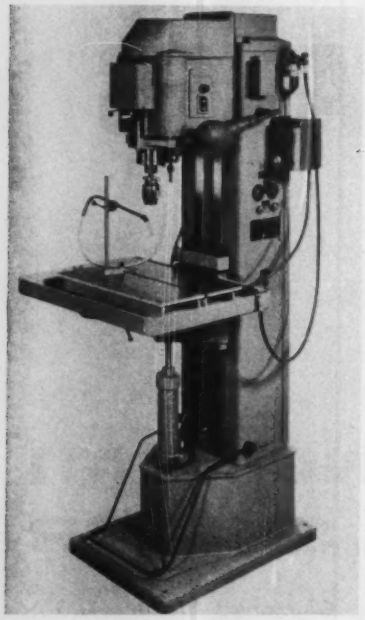
For further information, *write* Peerless Machine Co., 1600 Junction Ave., Racine, Wis. (Amphitheatre Booth 422.)

Table Air Positioned on Universal Drilling Unit

A VERTICAL, universal, drilling machine has infinite hydraulic feed control in conjunction with air feed. The hydraulic unit is adjustable for the amount of feed required and assures steady feed on interrupted cuts or breakthrough.

The machine has a drilling capacity of 3/16 to ⅝ in. in alloy steel. The worktable is automatically positioned by air for quick change of tools and fixtures. Two spindle speed ranges with eight changes in each range cover 300 to 1800 rpm. Solenoid units built into the machine synchronize clamping and indexing fixtures with the spindle cycle.

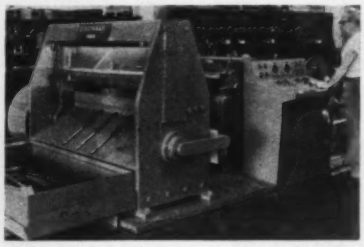
Other equipment includes a direct drive, vertical tapping unit with a capacity from ¼ to ⅝ in. and a horizontal drilling, tapping, and threading machine that can be used with hopper feed for long run operations and hand feed for short runs. Drilling capacity ranges from #60 to ⅜ in. and tapping capacity from #0 to ½ in.



For further information, *write* Snow Mfg. Co., 435 Eastern Ave., Bellwood, Ill. (Amphitheatre Booth 247.)

Shear Has Variable Rake

THE HYDRAULIC drive of the 4312H shear has an adjustable rake as a standard feature. Rake is variable from 0 to ¾ in. per foot. Capacities in mild steel are ½ in. x 12 ft at ⅜ in. rake, ⅝ in. x 12 ft at ½ in. rake, and ¾ in. x 6 ft at ¾ in. rake.



Hi-Speed sheet shear operates at 200 strokes per minute

The unit has a cutting speed of 135 in. per minute and a return speed of 290 in. per minute.

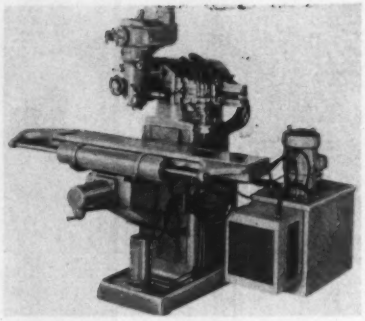
Another development is a Hi-Speed sheet shear. The steel underdrive, down cut unit operates at 200 strokes per minute and has a capacity of 10 gage x 5 ft for mild steel. Maximum cuts per minute are 125. The unit has a spring bar type hold-down and a combination air clutch and brake.

For further information, *write* Cincinnati Shaper Co., P. O. Box 111, Cincinnati 11, Ohio. (Amphitheatre Booth 1230.)

Mills, Presses, Shears Added to Famco Line

A NUMERICALLY controlled mill, electrohydraulic tracer controlled mill, hydraulic presses, and heavy duty power shears have been added to the Famco line.

The numerically controlled mill automatically guides machine movement, slides in the three axes, and eliminates errors and limitations of manual positioning and machining.



Famco three axis, hydraulic tracer mill

Famco's 2, 3, 4, 6, and 10 ton hydraulic presses have C frame construction designed for maximum rigidity, minimum deflection, and ample work area capacity.

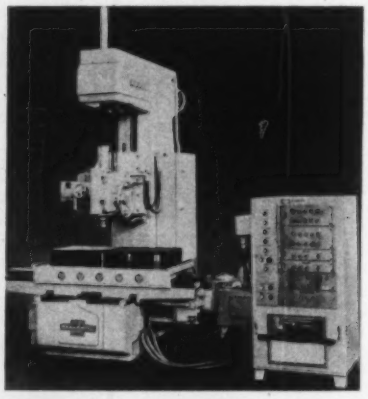
The 10 ft, heavy duty power shear (all steel) has a silent worm gear transmission, air friction clutch, and brake that compensates for wear. The bronze cross head gib bearings provide a total of 224 sq in. of bearing area to guide the crosshead.

For further information, *write* Famco Machine Co., Kenosha, Wis. (Amphitheatre Booth 331.)

Machine Tools Feature Speed and Accuracy

SIX MACHINE tools developed by Heald feature fast metal removal rates, optimum surface finishes, and tolerance control in grinding and boring operations.

The units include a numerically controlled Healdrill, Model 090 miniature internal grinder, 171A internal grinder, 322A Bore-Matic, Model S Bore-Matic with numerical



Tape controlled Healdrill permits direct programing of all functions

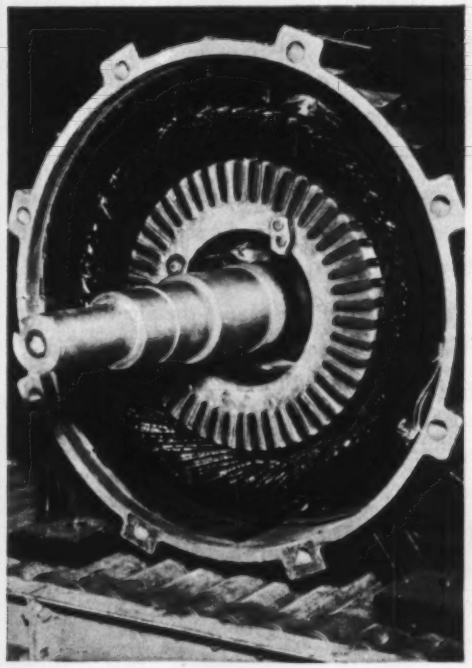
Copper Alloy Bulletin

BRIDGEPORT BRASS COMPANY

Bridgeport "CONTACT BRONZE"

Cuts Costs of Electrical Spring Contacts by 25%

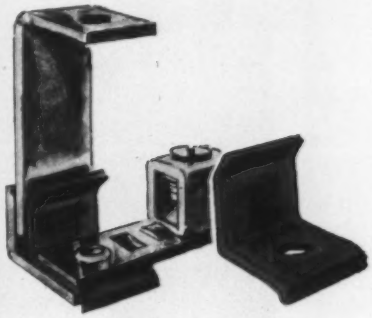
This outstanding Bridgeport alloy offers many of the superior mechanical qualities of phosphor bronze at considerably less cost...with a superior electrical conductivity rated at 22% IACS at 68° soft. Designed to meet the exacting standards of the electronics industry, Bridgeport "Contact Bronze" (Alloy 92) maintains spring properties even after difficult forming operations. Add corrosion resistance and "Contact Bronze" is a guarantee of efficient and reliable performance throughout your product's service life. Here are a few examples:



ELECTRIC MOTORS

The 100-hp 4-pole motors driving extruder-type machines in a dog-food plant were causing frequent production breakdowns. The material processed was so highly viscous that the motors were stalling, jogging and burning out. To meet the high torque, high slip necessary to minimize stalls and also to provide the high thermal capacity required, Allis-Chalmers Company designed a special motor rotor utilizing Bridgeport "Contact Bronze" in place of copper. Burnouts from overload were eliminated and the performance of the "Contact Bronze" motor was so excellent that Allis-Chalmers received an order for another sixteen of the same type.

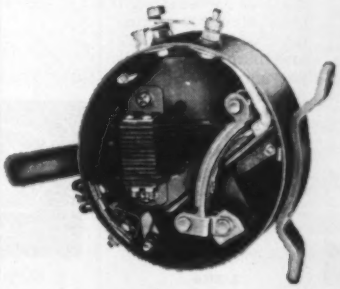
PRESSURE CLIPS



American Electric Switch Division, Clark Controller Company, found that "Contact Bronze" fitted their needs for a lower cost alloy for pressure clips. Its electrical conductivity, corrosion resistance, spring and formability properties were more than comparable with other alloys...at 25% less cost.

TRAILER TRUCK BRAKING SYSTEM

Warner Electric Brake & Clutch Company manufactures an ingenious electric brake system for heavy-duty trailer trucks. Through a graduated series of Bridgeport "Contact Bronze" leaves, it allows the driver to adjust torque instantly and smoothly to suit load and road conditions. The conductivity and performance-proved spring properties of "Contact Bronze" provide added safety and long-haul reliability.



✓Check the Savings

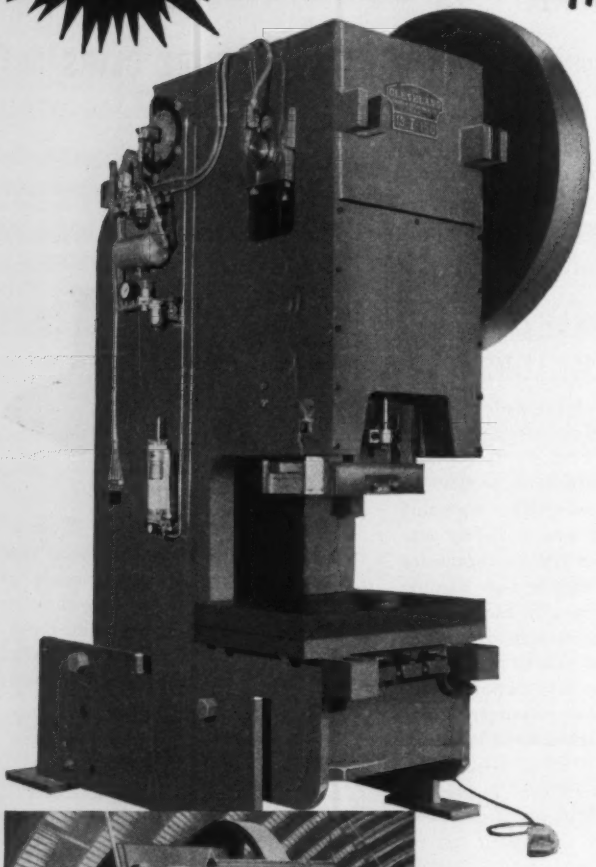
INVESTIGATE "CONTACT BRONZE"

Electronic and mechanical devices, switch gears, circuit breakers, contacts, terminals are just a few of the applications. There are thousands of others. Call your nearest Bridgeport Sales Office or write Dept. 3908 for full details of Bridgeport Contact Bronze. Bridgeport Brass Company, Bridgeport 2, Conn.

...DOES TOUGH JOBS *Dependably, Profitably*

CLEVELAND

NEW WELDED-FRAME COST-CUTTING *Open Back Inclinable* PRESSES



◀ At the Middletown Manufacturing Co. in Middletown, Ky., this new welded-frame Cleveland OBI Press is blanking and piercing 3/16"-thick steel for reclining chair fixture parts and blanks for compressor cases. This Model 13-I has 150-ton capacity, 6" stroke of slide, 4" slide adjustment, 30 x 45" bed area and operates at 35 strokes per minute.

A-2645A

● Stronger structural frame—streamlined and built to withstand the shock and vibration of heavy-duty stamping.

Dies last longer with less downtime for die maintenance due to Cleveland's large box-type slide that results in greater production accuracy.

75 to 200-ton capacity, built for safer, more efficient operation with all gears and drive mechanism guarded.

Ruggedly built for many different press operations, material can be fed in from either side or from front to back.

Three different positions—vertical, 15° and 30°—to accommodate various types of dies and at the same time make use of gravity feed and discharge in automated production lines, or in operations using a single press.

You get better stampings for less with a CLEVELAND Press—the new welded-frame cost-cutting Cleveland OBI Press.

Write Today for Cleveland's OBI Press Catalog OBI 3-60

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

E. 40th and St. Clair Avenue, Cleveland 14, Ohio

control and Model 4 tool sharpening machine.

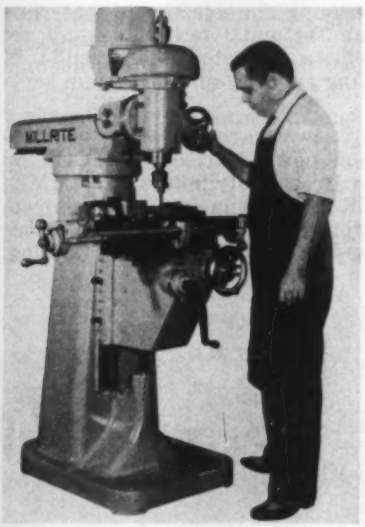
Major innovations announced by Heald: 1. Precision grinders are capable of handling internal work with increased upper and lower limits. 2. Improved tolerance control is coupled with higher rates of production through numerical tape control. 3. Systems are designed to provide better feeding methods, coolant control, compactness, easier maintenance, greater strength, and accuracy. The units will be shown in Chicago at The Machine Tool Exposition—1960, Booth 924.

For further information, *write* Heald Machine Co., Worcester 6, Mass.

Toolroom Milling Machine Has 7 x 27 in. Table

A VERTICAL, toolroom milling machine, the Millrite, is designed for precision milling and boring. It's equipped with a swivel head and is capable of angular and vertical operations.

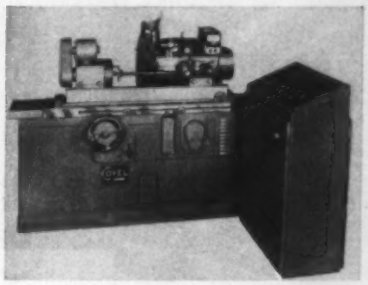
The ram and turret machine has a 7 x 27 in. table with longitudinal feed of 16 in., crossfeed of 8 in., vertical feed of 15 in., ram movement of 12 in., and a quill travel of 4 in. Maximum distance from the spindle nose to the face of the column is 16 in. and maximum distance from the nose to the top of the table is 18 in. The unit can be equipped with a compound head swivel for universal operations. Variations of the Millrite are available. Also developed are variations of the U. S. Duplex Half-Mill.



For further information, *write* U. S.-Burke Machine Tool Div., Cincinnati Mfg. Corp., 5055 Brotherton Rd., Cincinnati, Ohio. (Navy Pier Booths 241 and 243.)

Cylindrical Grinder Does Close Tolerance Work

THE 42A, a cylindrical OD grinder, has automatic sizing. Capacity is 10 in. diameter by 28 in. length. The grinding wheel is 18 in. in diameter, 3 in. wide, with a 5 in. hole. Spindle speed is 1200 rpm. You get headstock speeds of 59, 173, 287, and 400 rpm.



Standard equipment includes wet grinding, automatic sizer, wrenches, one grinding wheel adapter, all motors and controls, one set of two work driving dogs (¼ to 2½ in. capacity), and one grinding wheel.

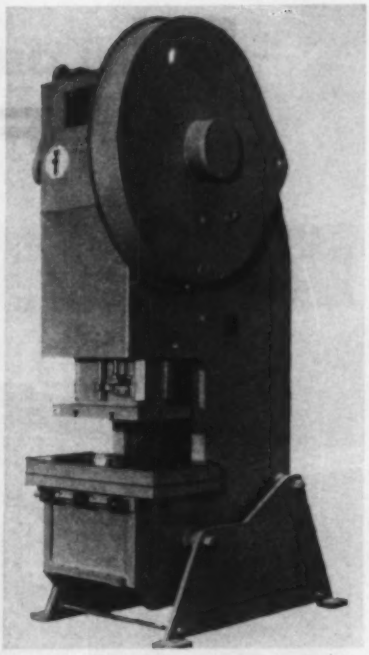
Other Covel developments include the No. 10P, hand feed, surface grinder with power assist, and the No. 30 optical comparator with a 30 in. viewing screen.

For further information, *write* Covel Mfg. Co., Benton Harbor, Mich. (Amphitheatre Booth 332.)

Gibs on OBI Mechanical Press Formica Lined

WELDED, rolled steel plate with heavy cross ribbing (fully stress relieved) is used in a single geared, OBI, mechanical press. Alignment of the box type slide is maintained by Formica lined gibs and long gib ways.

A fully guided, large diameter, long barrel type adjusting screw and a pneumatically balanced slide make the slide adjustment from the floor level quick and easy. The unit is equipped with an air friction clutch and brake assembly (heavy duty), safety locked electric push-button control, and a four position, selector switch (off, once, inch, and continuous).



For further information, *write* Ferracute Machine Co., Bridgeton, N. J. (Amphitheatre Booth 1122.)

Grinding Choice Offered: Contour or Conventional

PRECISION to ±100 millionths of an inch is featured on the 1200 Series, single spindle, vertical tracer or numerically controlled grinder.

The unit is designed for contour or conventional grinding. Available is a new, electrohydraulic, tracer system with ±10 millionths of an inch electrical accuracy. Manual control is standard.

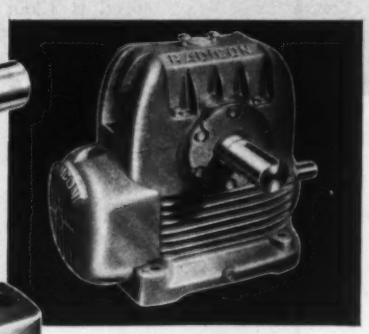
The two models of the 1200 have table diameters from 24 to 42 in. and nominal swings of 36 or 48 in. Infinitely variable feed and speed ranges with potentiometer controlled dc drive are supplied. Optional equipment is available.

Also announced is a custom designed Series 900 for conventional grinding and turning and contour-

(*Please turn to Page* 197)

FOOTE BROS. introduces a FAN-COOLED

- High load carrying capacity
- Super-efficient 2-way cooling for higher thermal ratings
- Unlimited mounting positions
- Automatic and positive lubrication
- IN STOCK for immediate delivery



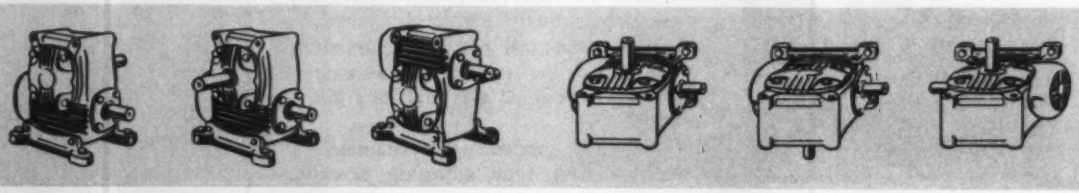
- 12 sizes—Center Distances from 1⅛" to 8"
- Rated to NEW AGMA Standards
- Ratios from 5:1 to 70:1
- Output torque to 46,000 lb. in.
- Input capacities from .01 to 66 HP

Foote Bros. RADICON Worm Gear Reducers incorporate *totally new* concepts of speed reducer design and construction. From the inside out and top to bottom, they embody years ahead thinking to provide users with more efficient, more versatile right angle power transmission in minimum size units.

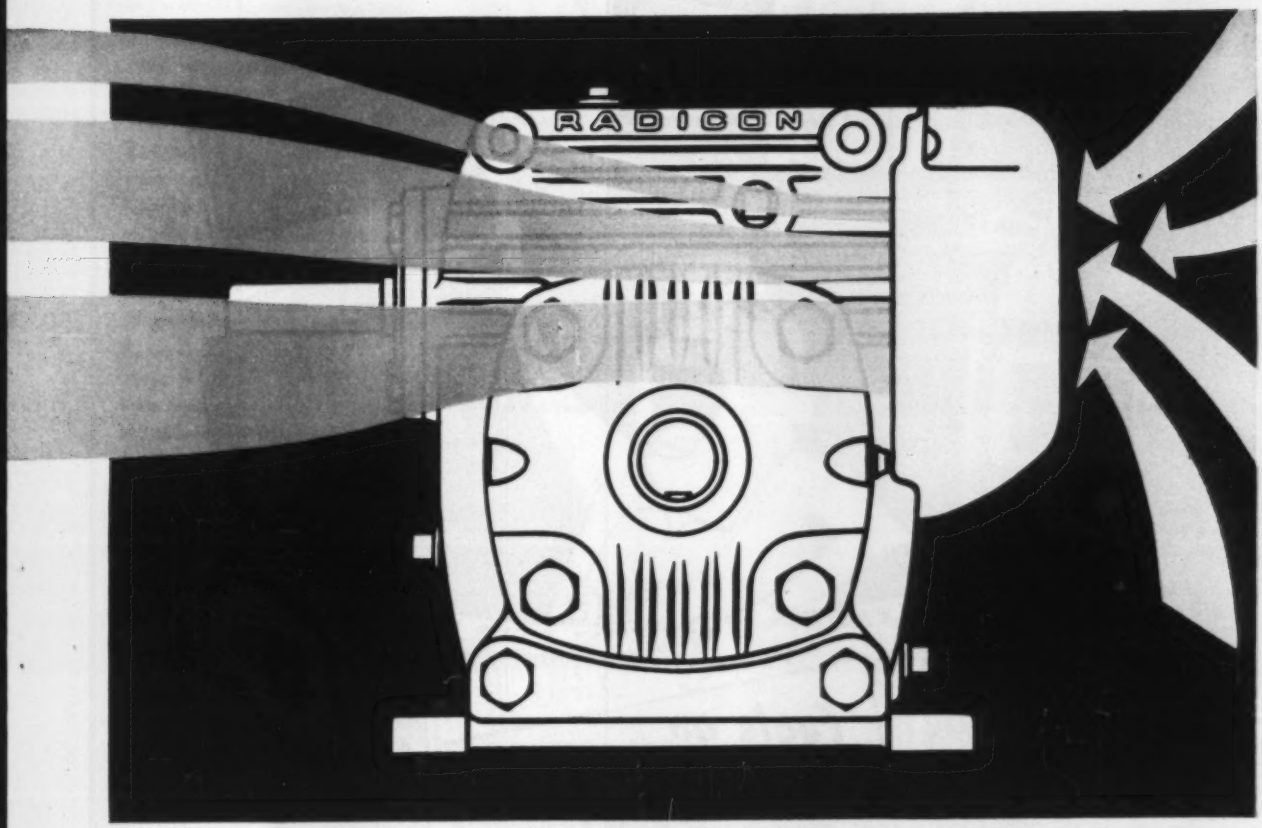
Gear accuracy and surface finish, bearing and shaft design, positive lubrication, extreme efficiency controlled cooling, the selection of materials and precision manufacturing techniques—all reflect careful attention to detail that results in higher load carrying capacity and maximum service life.

These outstanding new fan-cooled worm gear reducers are available now—carried IN STOCK by Authorized Foote Bros. Distributors for IMMEDIATE DELIVERY. See them soon. Get complete details on the performance, versatility, and service life they will bring you. Write for RADICON Catalog.

UNLIMITED MOUNTING POSITIONS



COMPLETELY NEW and ADVANCED line of WORM GEAR REDUCERS



RADICON Reducers operate in a STREAM OF AIR for maximum thermal efficiency

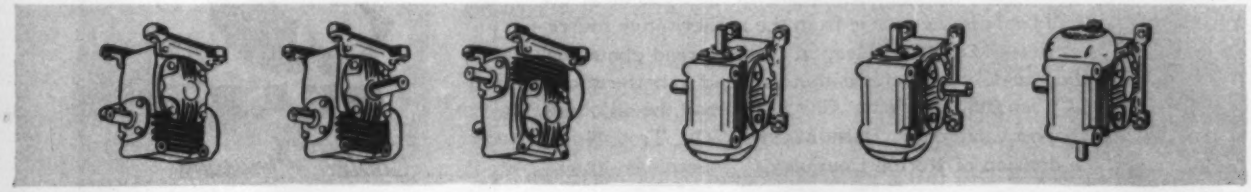
Advanced design of RADICON Worm Gear Reducers and their high efficiency radiation and convection cooling for controlled transfer of heat to the outside air, permit *identical* thermal and mechanical ratings in most cases. For infrequent or intermittent service, thermal ratings can be ignored.

A moving stream of air, induced by the maximum diameter fan, forcing high velocity cooling air along horizontal channels formed by the external ribbing, dissipates radiated heat to hold the Reducer's temperature rise to a minimum. Cooling is equally efficient at any mounting position.

FOOTE BROS. **GEAR AND MACHINE CORPORATION**

4583 South Western Boulevard, Chicago 9, Illinois

POWER TRANSMISSION DRIVES



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BEAR BRAND
Coated Abrasives

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5. Coated Abrasives Today. Shows the range and variety of these materials for every grinding and polishing job.

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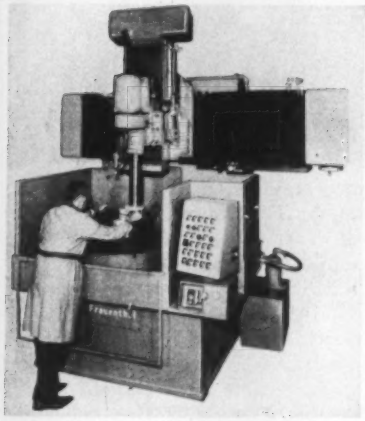
(*Continued from Page 191*)



ing of such things as nose cones. It's available with tracer, numerical, and manual control.

For further information, *write* Frauenthal Div., Kaydon Engineering Corp., Muskegon, Mich. (Amphitheatre Booth 1220.)

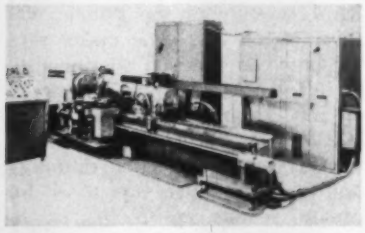
Numerical, Tracer Control Combined on Engine Lathe

WITH an electronic duplicating system and a tape controlled discreet positioning system, the American lathe (2509) can do stepshafts, contours, fillets, radiuses, tapers, and other free forms.

It's powered by a 50 hp, constant horsepower, 4:1 variable speed main drive motor. The 20 spindle speeds, ranging from 50 to 900 rpm, are tape selected.

Among other units developed by the company is an American 4025 Pre-Select engine lathe and a numerically controlled, traveling, 19 in. column, open side, boring and drilling machine.

The Model 4025 lathe has preselective, hydraulic, gear shifting that eliminates noise by oscillating the gears during shifting. Spindle speed range is 6 to 700 rpm. The center spindle bearing has a radial load capacity of 61,600 lb at 100 rpm.



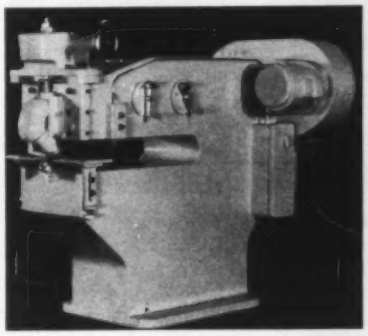
The boring and drilling machine has 32 spindle speeds with a range from 20 to 1600 rpm and 16 feeds with a range of 0.003 to 0.125 in. per revolution.

For further information, *write* American Tool Works Co., Pearl Street at Eggleston Ave., Cincinnati 2, Ohio. (Amphitheatre Booth 381.)

Rotary Shear Has 36 in. Throat Depth

THE Model 25A Beatty Quickwork rotary shear (weldment design) has a shearing capacity of ¼ in. mild steel.

The throat depth is 36 in. Three cutting speeds are provided: 8, 14, and 20 feet per minute. The upper cutter head can be operated through a worm drive and hand wheel or a motorized drive can be substituted. Attachments can be added.



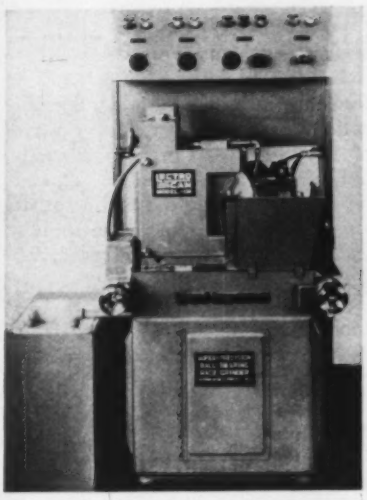
For further information, *write* Beatty Machine & Mfg. Co., 150th and Oak Street, Hammond, Ind. (Amphitheatre Booth 243.)

Ball Bearing Race Grinder Meets Close Tolerances

ACCURACY is emphasized by Van Norman in presenting a miniature, ball bearing, precision, race grinder and two, ram type, milling machines.

The race grinder (Lectro-Cam, Model 1-M) also can be used to grind both the inner and outer rings of miniature bearings to extremely close tolerances.

The milling machines (1R-22-3 and 1RQ-22-3) are based on Van Norman's 16 series design and supplant Models 16M and 16S. The units are designed for faster, more precise production at lower cost. The company will display equipment in Chicago at The Machine Tool Exposition—1960, Booth 351.



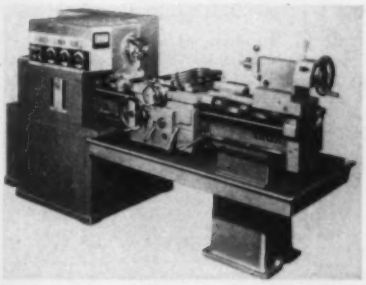
Race grinder works to tolerances of less than 50 millionths of an inch

For further information, *write* Van Norman Machine Co., a division of Van Norman Industries Inc., 3640 Main St., Springfield 7, Mass.

Lathe Designed for High Speed Turning, Facing

PRODUCTION on straight turning, facing, and boring operations can be increased by the Barber-Colman 16 in. lathe (Model 1610). The specialized unit has no gearbox or threading equipment. Speeds and feeds are controlled by dials on the headstock.

Less than 20 minutes is required for setup. The lathe can be operated manually without removing the tracer or the attachment can be replaced with the regular compound in less than 10 minutes. Speeds and



feeds are infinitely variable. Specifications include a swing over ways of 16½ in. (a 20 in. unit is available), center distances of 30, 42, and 54 in., and standard spindle speeds from 50 to 1500 rpm. The spindle motor (dc) is a variable speed, 6.5 hp unit.

Other developments include a toolroom lathe, a tracer controlled lathe, an automatic dresser, and hobbing machines.

For further information, *write* Barber-Colman Co., 115 Loomis St., Rockford, Ill. (Amphitheatre Booth 923.)

Broaching Machine Is Twin Ram, Pull-Down Type

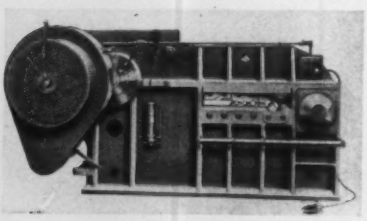
A TWIN ram, pull-down, broaching machine has been developed by Colonial. Advantages of the twin ram include high rate of output and ability to load one fixture on the machine while the other ram is cutting.

For further information, *write* Colonial Broach & Machine Co., P. O. Box 37, Harper Station, Detroit 13, Mich. (Amphitheatre Booth 241.)

Bar-Billet Shear and Forging Unit Announced

THE No. 500 bar-billet shear can handle mild steel bars up to 4 in. in diameter. The 1½ in. automatic forging machine can handle bar stock through four die passes. It has rated output of 60 completed forgings per minute with a maximum bar size of ¾ in. diameter by 24 in. long.

Other Hill Acme developments include a 48 in. x 12 ft long sheet polishing machine for stainless steel sheets. The sheet polisher can produce finishes up to and including No. 8 in stainless steel. A new 12 in. x 42 in. horizontal spindle grinder



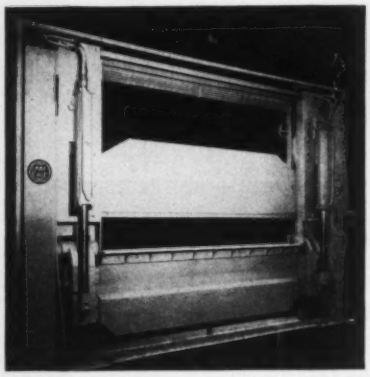
can handle hardened steel shear blades. This unit can operate at 100 in. per minute, using a magnetic chuck, and hold tolerances within 0.0002 in. The equipment will be shown in Chicago at The Machine Tool Exposition—1960, Booth 1240.

For further information, *write* Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio.

Unit Does Intricate Plate Bending Without Dies

THE Form-All, double apron, bending brake is used without dies. It's available in sizes from 2 ft x 16 gage up to 16 ft x ¾ in. capacity.

Front and rear wings are independently operable. The unit can make parts with all fundamental



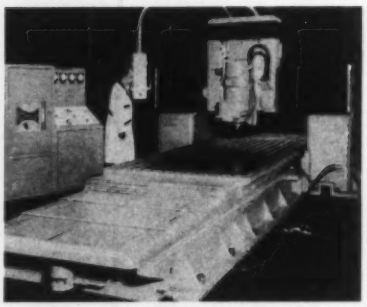
bends and combinations of bends, including sharp angular bends on or at the end of a radius and full 360 degree radius bends. The units are offered for hand, air, and hydraulic operation.

For further information, *write* Lake Erie Machinery Corp., Box 68, Kenmore Station, Buffalo 17, N. Y. (Amphitheatre Booth 542.)

Milling, Profiling Units Are Operated by Tape

TRAVELING table, vertical spindle, and bridge type design are featured in the 200 Series Eccomill, continuous path, tape controlled, milling and profiling machines. The series covers a broad range of sizes.

Characteristics include antibacklash, recirculating, ball bearing, precision screws on each axis; antifriction, unit type, recirculating, roller bearings on the table (saddle and



vertical slide operate on hardened ways); Dial Speed, water cooled, direct current milling head with continuously variable spindle speeds from 15 to 6000 rpm; protection of way surfaces by wipers and full way covers; and control by magnetic or punched tape control systems.

For further information, *write* Ekstrom, Carlson & Co., Rockford, Ill. (Amphitheatre Booth 846.)

Vertical Honer Handles Small Diameter Bores

HIGH production on small diameter bores can be attained with the Model 122 vertical honer. The compact unit is equipped with a 12 in. stroke and a 12 in. swing and can handle bores up to 2 in. in diameter at a maximum stroke.

The hydraulic pump, coolant pump, and hydraulic valves are mounted in the open to ease maintenance. Infinite hone feed adjustment is controlled by a simplified electric hone expansion unit.

The company is also showing a high capacity mechanical unit with a thrust capacity of 30,000 lb and a new immersed drum filter.

For further information, *write* Barnes Drill Co., 814 Chestnut St., Rockford, Ill. (Amphitheatre Booth 152.)

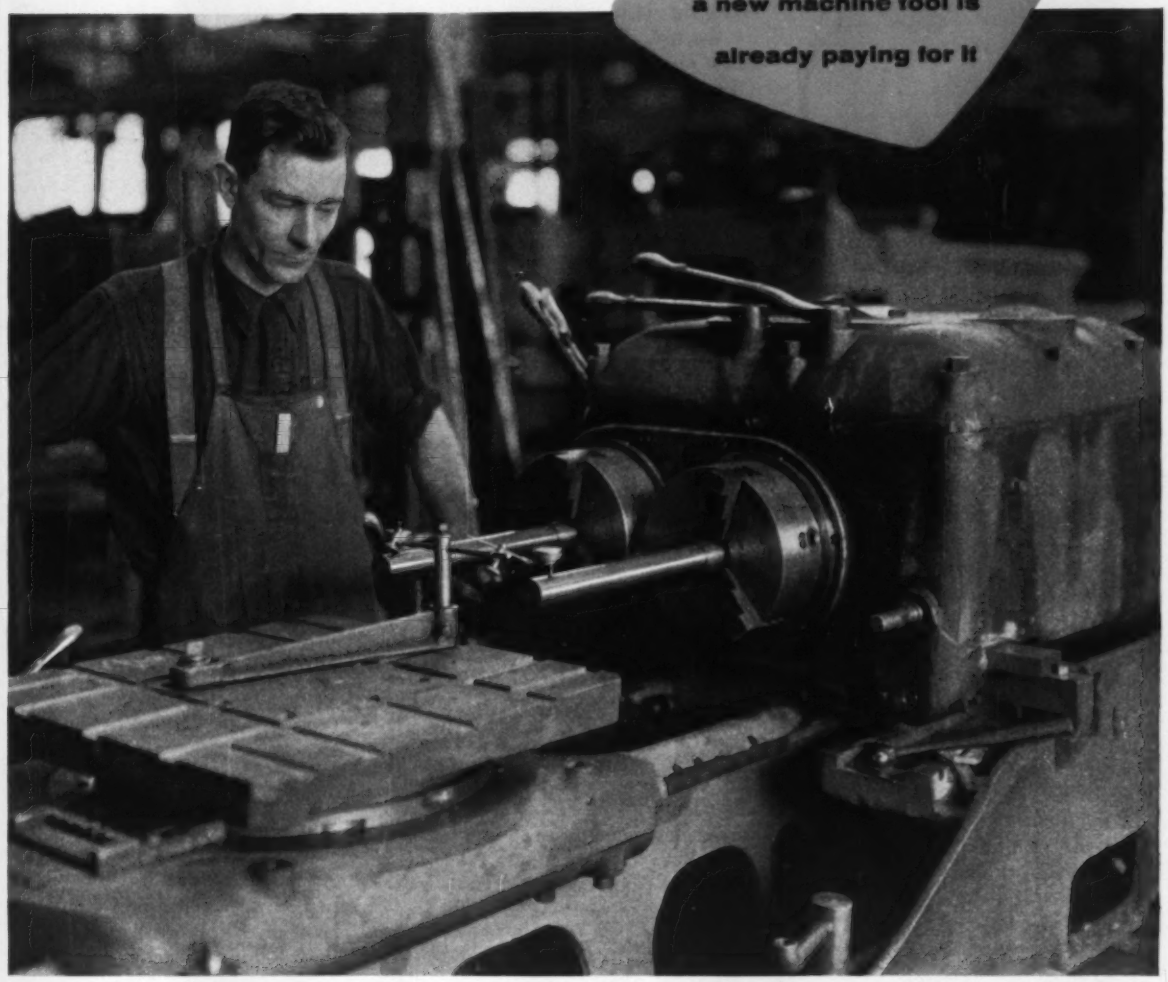
Billet Shear Handles 2 x 12 in. Bars

RAM capacity of the Buffalo 400 shear is 400 tons. The maker says the unit can function continuously at full capacity (within its rating) on any shearable material.

It operates at speeds up to 60 strokes per minute (free running) and handles billets up to 4 in. square, rounds up to 4½ in. in

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it



It's Useful . . . but is it still Profitable?

Provide competent people with the proper equipment, and you have the key to sustaining a sound, healthy business condition.

Incompetence in people is detected sooner than later, and they are replaced. It's the value of the equipment that fools most of us. Just because a machine still runs, possibly as well as when new, it's generally considered as useful. But it's not *usefulness* that brings home the bacon — it's *profitableness*.

New, improved methods, and the machines to implement these methods, are being created constantly. If your methods and equipment do not stay abreast of competition, at the least, you inevitably will be out-produced, out-priced, and out of business.

Most of the really good new machine tools now available to industry will pay for themselves in a short time, and will roll up profits besides. We think this is true for some other makes of machines — and we *know* it is true for each and every item in the complete line of Jones & Lamson equipment.

J & L machines are easier to acquire than you may think, too.

Investigate the new J & L Profitivity Lease Plan. It requires no money down, no advance payments — in fact, no payments of any kind are required until thirty days after the machine has been shipped.

Write to Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vt. for Machine Replacement and payment plans.

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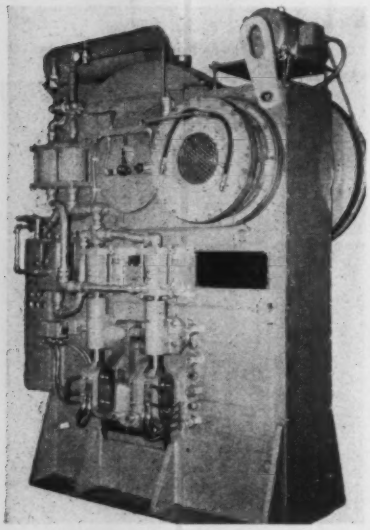


diameter, flat bars up to 2 x 12 in. The maximum size handled without machine modification is 5 in. square or round. Machine stroke is 2 in. A minimum clearance of 1 in. is provided above the incoming workpiece. It comes equipped with electrical controls.

Other units include a Buffalo hollow spindle RPMster for drilling such things as exotic metals and cermets. Special units are available with hollow spindles.

For further information, *write* Dept. 56, Buffalo Forge Co., 490 Broadway, Buffalo, N. Y. (Amphitheatre Booth 551.)

Toolroom Lathe Has 5 hp Drive Motor

PRECISION toolroom turning, boring, facing, and threading are jobs that can be scheduled for the 10 in. Model EE lathe. It performs superaccurate operations on such parts as small jet, missile, instrument, electronic, and camera components.

A 5 hp, dc drive motor obtains its power through an electronic unit that can use almost any source of ac current. The company says the power supply minimizes vibration at all speeds, practically eliminates noise, improves speed regulation regardless of load and maintains better torque at lower speeds. Drive to the spindle is direct through multiple V belts. The standard spindle speed range is infinitely variable between 5 and 3000 rpm (optional range between 6.5 and 4000 rpm). Also offered by the company is a 10 in. Model EE precision manufacturing lathe without provision for the use of a lead screw or other screw cutting parts.

For further information, *write* Monarch Machine Tool Co., Sidney, Ohio. (Amphitheatre Booth 701.)

High Capacity Bar Machine, Boring Unit Developed

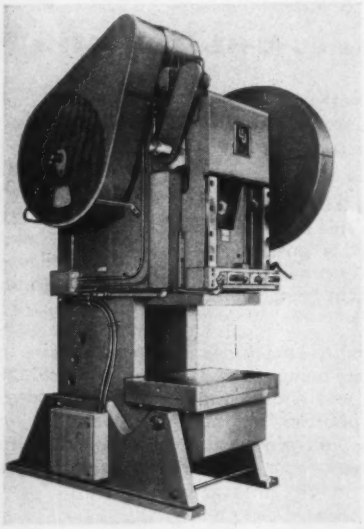
THE Model 52, six spindle, bar machine is one of a series of large capacity bar machines. Also available is a Model 44 in a series of vertical precision boring machines.

For further information, *write* New Britain Machine Co., New Britain, Conn. (Amphitheatre Booth 838.)

125 Ton OBI Press Has 29 x 42 in. Die Capacity

BOX slide and twin air counterbalances are used on the L & J, 125 ton, OBI press. Constructed of welded steel, the press is heavily reinforced for maximum strength and resistance to deflection. The air clutch is mounted on the backshaft. Die capacity is 42 x 29 in.; shut height, 18 in.

A 90 ton, OBI unit has been added to the line. It has cast frames (Grade A Meehanite). It provides the strength required for the greater throat depth and bolster area. An air clutch is standard.

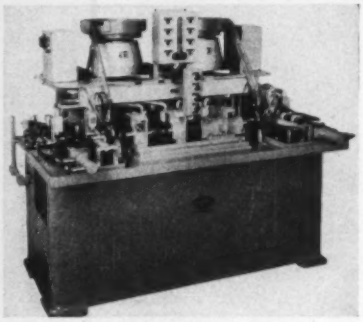


A redesigned version of the L & J, 27 ton press has greater rigidity for operation at higher speeds. Air or mechanical clutches are available.

For further information, *write* L & J Press Corp., P. O. Box 315, Elkhart, Ind. (Amphitheatre Booth 1116).

Limit Switch Protects Double Ended Tapper

A MODEL 58, double ended, continuous tapper has dc braking for reversal and is interlocked to prevent damage to the spindle or tooling.



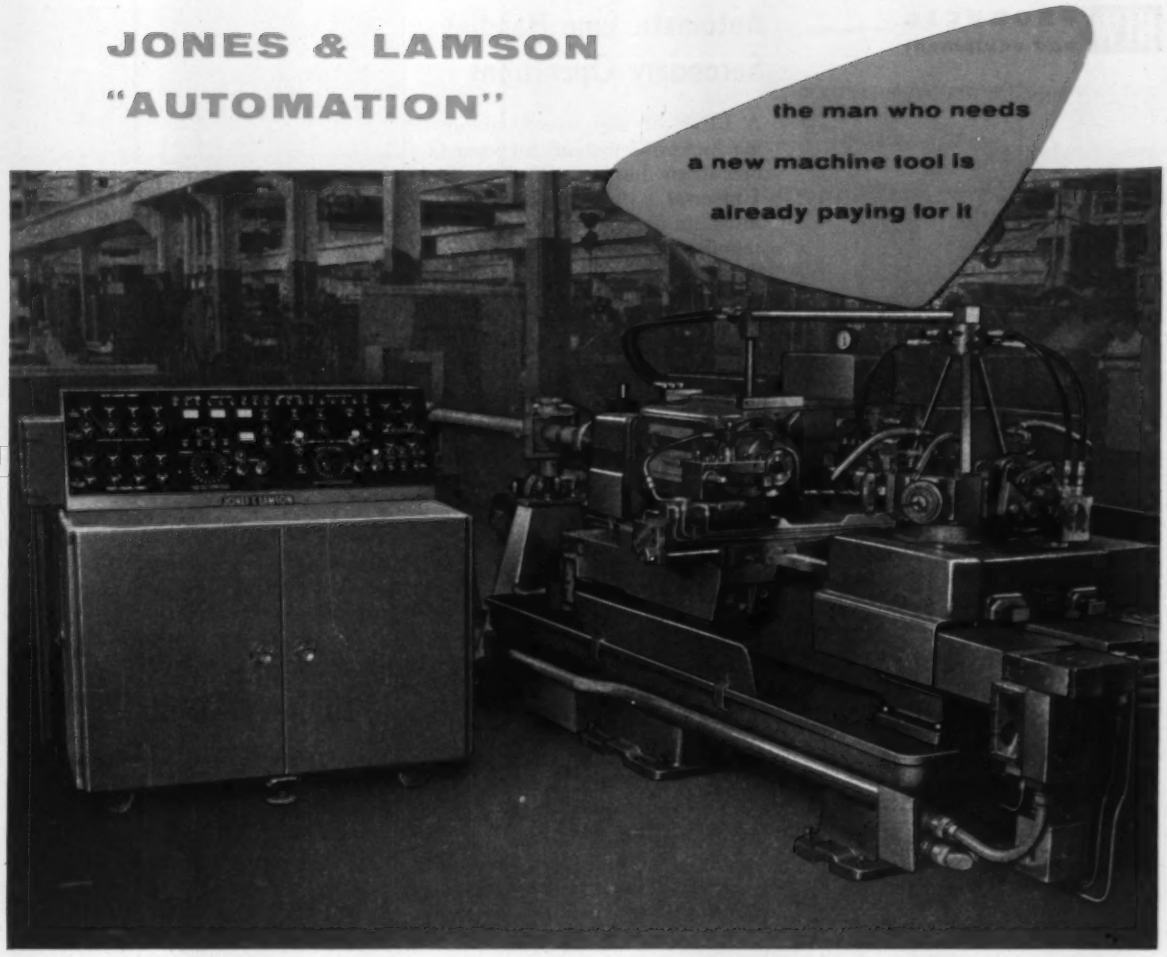
The spindle (a lead screw spindle with tapholders on each) taps one end while withdrawing on the other. The spindle is driven by a heavy duty, high reversal motor. Plug-in limit switches check for complete index, clamping pressure, and failure of spindle stop switches, or air pressure. Any malfunction stops the spindle and a trouble light indicates location of the failure. Spindles (for Bodine equipment) have also been developed.

For further information, *write* Bodine Corp., 317 Mountain Grove St., Bridgeport 5, Conn. (Amphitheatre Booth 828.)

Milling Unit Equipped With Automatic Scanning

AUTOMATIC scanning is featured on the Scan-O-Matic milling machine. The tracing stylus automatically follows the contour of a master

JONES & LAMSON "AUTOMATION"



New numerically-controlled turret lathe shatters idle time . . . is ideal for short runs

At the last Machine Tool Exposition, five years ago, Jones & Lamson exhibited an automatic tape-controlled turret lathe. It created a sensation and attracted thousands of fascinated spectators. Many of them wanted to buy. But the machine wasn't for sale. Why? Because there were still "bugs" in it to be ironed out, and our reputation is too valuable to risk on an "almost" product.

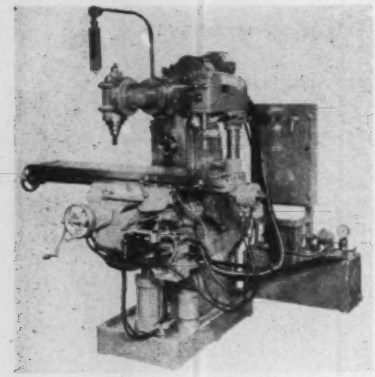
In the five years since, J & L still kept this lathe off the market, pending its complete development and proving-out. Now, it is ready to be shown, ready to be sold, ready to help you attain new production efficiency.

The new J & L numerically-controlled turret lathe is a complete redesign job. The sound features of the early prototype have been retained, and all question marks have been eliminated. In every way, this is a real beauty!

It's designed especially for short run production and top economy. It has the capacity of a No. 5 machine, 2½ x 24 in., and has three turrets (one hexagon and two square) which accept up to 14 preset tools. A set of tools plus the tape can be "packaged", ready for set-up when needed.

This lathe can be set up as either a bar machine or a chucker, in 10 to 15 min. It positions within .001″, repeats to .0005″. Drive motor is 30 HP, with spindle speeds of 40 to 2000 rpm in 24 steps. Feed rates for carriage and saddle are .750″ to 30.0″ per minute in 16 steps, plus fast motion. Cross-slide operates at one-half these rates. Tape input information may be adjusted for extended tool life and size control by manual dials on the control panel. Productivity is increased 25 to 30% over standard cycle time. Even the automatic bar feed is programmed from the tape. See it at Chicago, or write for advance information now. Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools



regardless of whether straight walls, angles, or curves are to be cut.

Constant torque, hydraulic motors provide rotary power. Adjustable stops, operable from the motion of the table saddle or the motion of the knee, trip the table reversing valve at the end of each stroke. At the same time, an indexing motor crossfeeds the work for a new cut. The knee is operated automatically (vertically) by a hydraulic cylinder. The tracer head has adjustable feed controls from 0 to 12 in. per minute.

For further information, *write* Greaves Machine Tool Co., 2069 Eastern Ave., Cincinnati 2, Ohio. (Amphitheatre Booth 1439.)

Machining Unit Adaptable To Model Change Needs

A VERTICAL turner and a No. 250 Turret-Dex (tape controlled, turret drill) have been developed by Motch & Merryweather and its Avey Div.

The vertical turner, a production machine tool, can be changed easily and simply to match model change requirements and new turning problems. To change the chip removal performance of the unit, it is only necessary to reposition slides on which the cutting tools are mounted. Adjustments can be made in the control system.

All hydraulics are externally mounted. Tool positions can be easily changed. Automatic, sequential programing is used.

For further information, *write* Motch & Merryweather Machinery Co., 1250 E. 222nd St., Cleveland 17, Ohio. (Amphitheatre Booth 822.)

Automatic Line Handles Secondary Operations

A LINE of high speed, automatic machines and systems for secondary operations has been developed by Universal - Automatic Corp. The units are useful to speed up drilling, tapping, reaming, nut tapping, cross drilling, hollow milling, countersinking and similar operations, says the company.

The machines and systems consist of one or more units mounted at any angle or in any position desired. Each unit has an individual spindle driven motor with speeds ranging from 500 to 10,000 rpm. Each spindle is advanced and retracted by twin double acting air cylinders.

For further information, *write* Universal - Automatic Corp., 9545 Ainslie St. Schiller Park, Ill. (Coliseum Booth 748.)

See Hydraulic Presses Do Assembly and Trimming

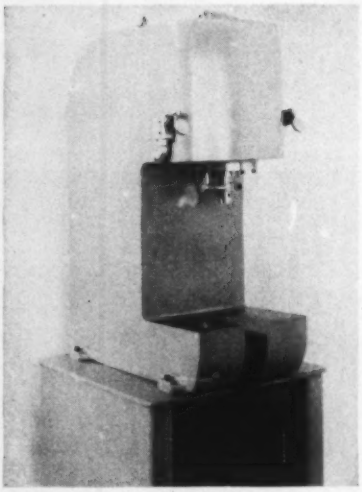
HIGH speed production on hydraulic assembly and trimming presses developed by Hannifin Co. save on labor, the firm says. Nine units will be displayed at The Machine Tool Exposition—1960. Two will be in operation making parts for Hannifin customers.

For further information, *write* Dept. 124, Hannifin Co., a division of Parker-Hannifin Corp., Des Plaines, Ill. (Amphitheatre Booth 652.)

11 in. Daylight Provided In Bench Type Press

FAST ASSEMBLY, forming, riveting, staking, crimping, and other operations can be done on the B-2 bench type press. The self-contained unit is driven by a 3 hp, 1800 rpm, flange mounted motor. It's directly coupled to a hydraulic pump.

It has ample horsepower for a full power stroke and to hold power on work, if required. Down speed of ram is 900 ipm; work speed, 176 ipm; return speed, 300 ipm. The press can take 10½ in. diameter work (it has 11 in. of daylight).



Other units include a hydraulic expanding machine, hydraulic presses, and an arbor press.

For further information, *write* Greenerd Arbor Press Co., Nashua, N. H. (Amphitheatre Booth 541.)

Vibration Monitor Used to Protect Motors, Turbines

EQUIPMENT or processes that might be damaged by excessive vibration can be protected by a vibration monitor. A visual or audible alarm can be set off when a preset, acceptable vibration level is exceeded. Suggested uses: Mounting in a precision grinder to indicate maximum surface finish possible with a wheel; protection for motors, gas turbines, and other equipment.

Another unit (a vertical balancer) balances clutches, flywheels, sheaves, fans, or other rotating parts that can be balanced by a single plane method.

For further information, *write* Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill. (Navy Pier Booth 465.)

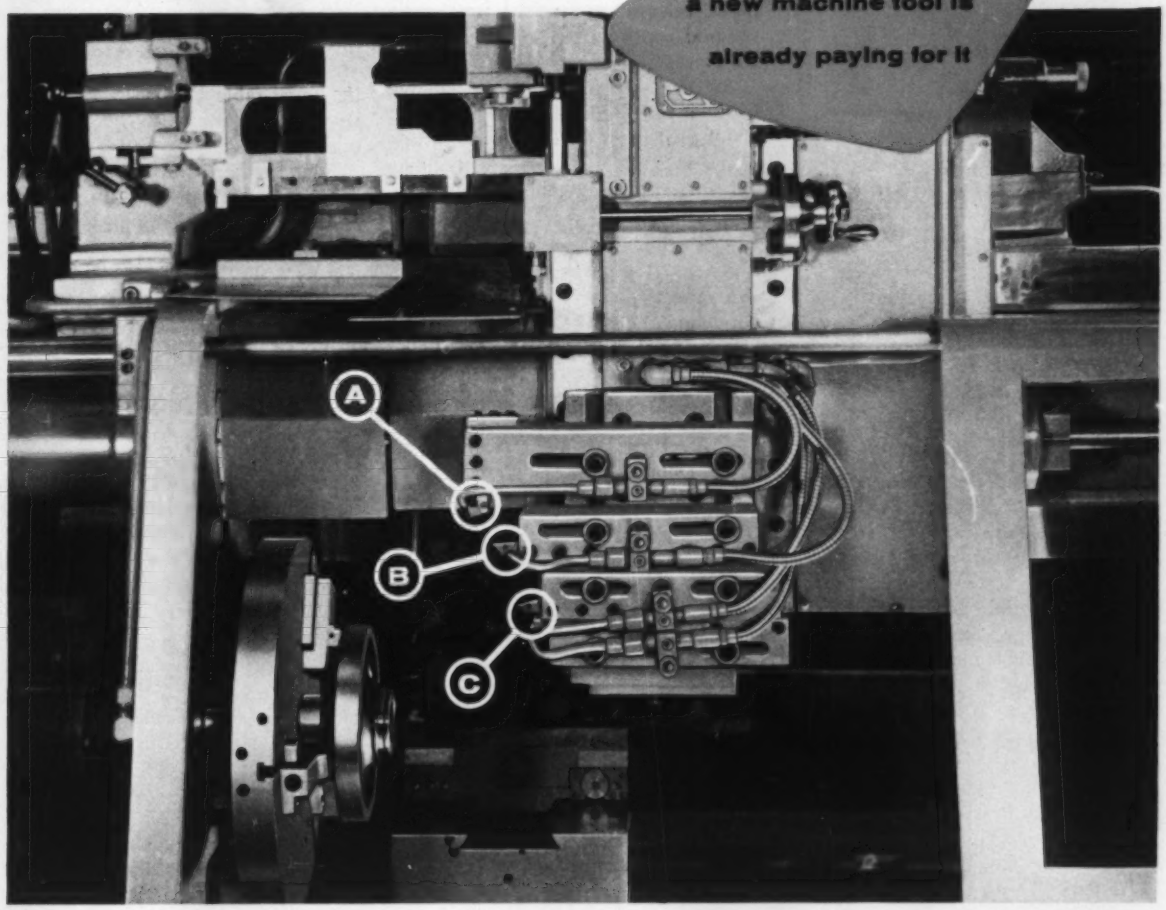
Presses Equipped for Progressive Diework

TWO POINT, straight side presses in the P2-45 line have exceptional slide guiding and slide to bed parallelism, the maker says. They are built for progressive die operations.

Auxiliaries include the company's ViscoMatic, continuous, recirculating, oil lubrication system. The fly-

JONES & LAMSON
MACHINE TOOLS

the man who needs
a new machine tool is
already paying for it



Multiple Tool for a Fully Automatic Two-Dimensional Tracing Cycle

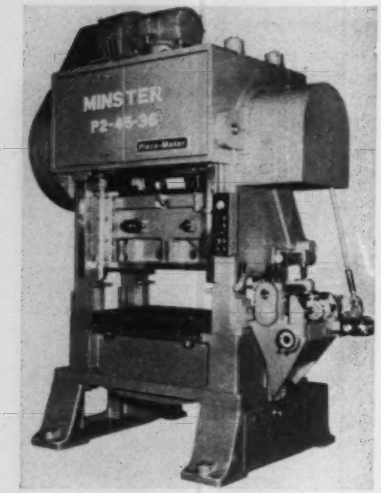
The two-dimensional tracing slide on the new Jones & Lamson Model 30 Automatic Tracing Lathe provides a new opportunity for multiple tooling on tracing operations. In addition, this slide offers eight different tracing cycles for tool motion — each of which controls tool travel through a full 180° of motion.

Automatic speed and feed changes during a cut allow for the proper cutting speeds on varying diameters, resulting in longer tool life, better cycle time, and desired surface finish. *For Example:* The illustration above shows the machine as it is tooled up for one of a variety of sizes of gear blanks. Three tools on the tracing slide machine the various surfaces of the blank in one completely automatic cycle. Tool "A" approaches the work first. It chamfers and turns the O.D. At the end of the turn, tool "C" is in position to chamfer and face the contour of the hub. As this is completed, tool "B" faces the piece, contours the large radius at the flange and faces the flat surface at the face of the gear blank O.D. Automatic speed and feed changes may occur as each tool is engaged.

Multiple tooling of tracing operations not only shortens tracing cycles, but also offers the opportunity for proper tool geometry for each particular phase of the operation. Set-up from one job to another is accomplished in a matter of minutes by graduated dog rings on the conveniently located control drum.

You can see this machine in operation at the NMTBA Exposition, Booth #839, in Chicago. Or you can get detailed information now by writing for Catalog No. LO-6011. Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools



wheel brake is electrically interlocked with the drive stop circuit. Minster P2 Piece-Maker Presses are available in nine capacities from 20 to 300 tons, four widths in each capacity.

Other new units include the B1-22 high speed gap presses (capacity: 16 to 60 tons) and a line of OBI presses (capacity: 12 to 75 tons).

For further information, *write* Minster Machine Co., Minster, Ohio. (Amphitheatre Booth 1339.)

Miniature Die Produces Threads Down to No. 000

A BELT grinder (Loungway) and a miniature, solid, adjustable die have been announced by Eastern Machine Screw Corp.

The die measures less than 1 in. in diameter and is designed for use on Swiss type automatics. It can produce quality threads as small as No. 000.

For further information, *write* Eastern Machine Screw Corp., 10 Barclay St., New Haven 6, Conn. (Amphitheatre Booth 745.)

Modifications Include Friction Spindle Brake

DEVELOPMENTS from South Bend Lathe include sectional tables that can be assembled to any length to accommodate multiple head and column assemblies and work fixtures. End legs and inner legs have leveling bushings and pads.

Easier, smoother manual operation is reported for the quill feed of the vertical milling machine. A quick release mechanism frees the manual control from any hydraulic back pressure.

An Easy-Up table elevator facilitates raising and lowering South Bend drill press tables. No rack or screw is used. A pumping motion raises the table on the column.

The 13 in. turret lathes now in use can be fitted with a manually operated, friction spindle brake that disconnects power to the lathe motor when the brake is applied.

For further information, *write* South Bend Lathe Inc., South Bend 22, Ind. (Coliseum Booth 210.)

Beveling Machine Cuts Weld Preparation Time

THE Pullmax X-8 beveler prepares plates for arcwelding in less time than with hand methods.

A serrated cutting wheel feeds the work through the machine and a predetermined bevel is neatly cut from the edge of the plate. The units are available in models that cut 30, 37½, and 45 degree bevels.

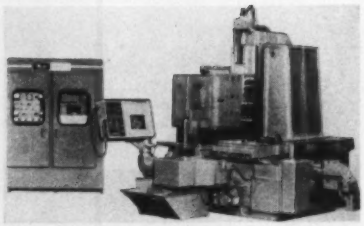
For further information, *write* American Pullmax Co., 2455 N. Sheffield Ave., Chicago 14, Ill. (Coliseum Booth 207.)

Numerical Control Unit Uses Punched Tape

TAPE preparation for the Dyna-Path-20, numerical control unit, is relatively simple with its circular interpolation feature.

The standard, eight channel, punched tape uses the binary coded, decimal format which may be prepared without a computer for parts machined from straight line and circular cutter paths. The unit may be seen on the three spindle, Pratt & Whitney Numeric-Keller.

Other equipment includes a DynaPoint-20, positioning control, operating on a closed loop, servo system and capable of an electronic resolution of 0.000010 in. With that resolution, the unit can position a

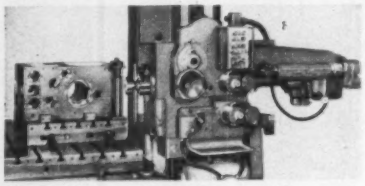


jig borer table to tolerances of less than 0.0001 in. with the range of table travel.

For further information, *write* Industrial Controls Section, Bendix Corp., 21820 Wyoming Ave., Detroit 37, Mich. (Navy Pier Booth 530.)

Tape Control System Has Simplified Programing

A POINT to point, numerical, tape control system (Tapac) for automatic measuring, positioning, and cycling complete programs uses 1 in., eight channel, standard, punched tape input. You'll find it on the Model 3H-72 Jigmil.



Procedure for making a tape is simple; only the basic information need be programed. Reason: Many automatic machine movements are functions of the electrical sequences of the machine itself and do not have to be programed into the tape.

For further information, *write* DeVleig Machine Co., Fair Street, Royal Oak, Mich. (Amphitheatre Booth 431.)

Units Isolate Vibration In Wide Temperature Range

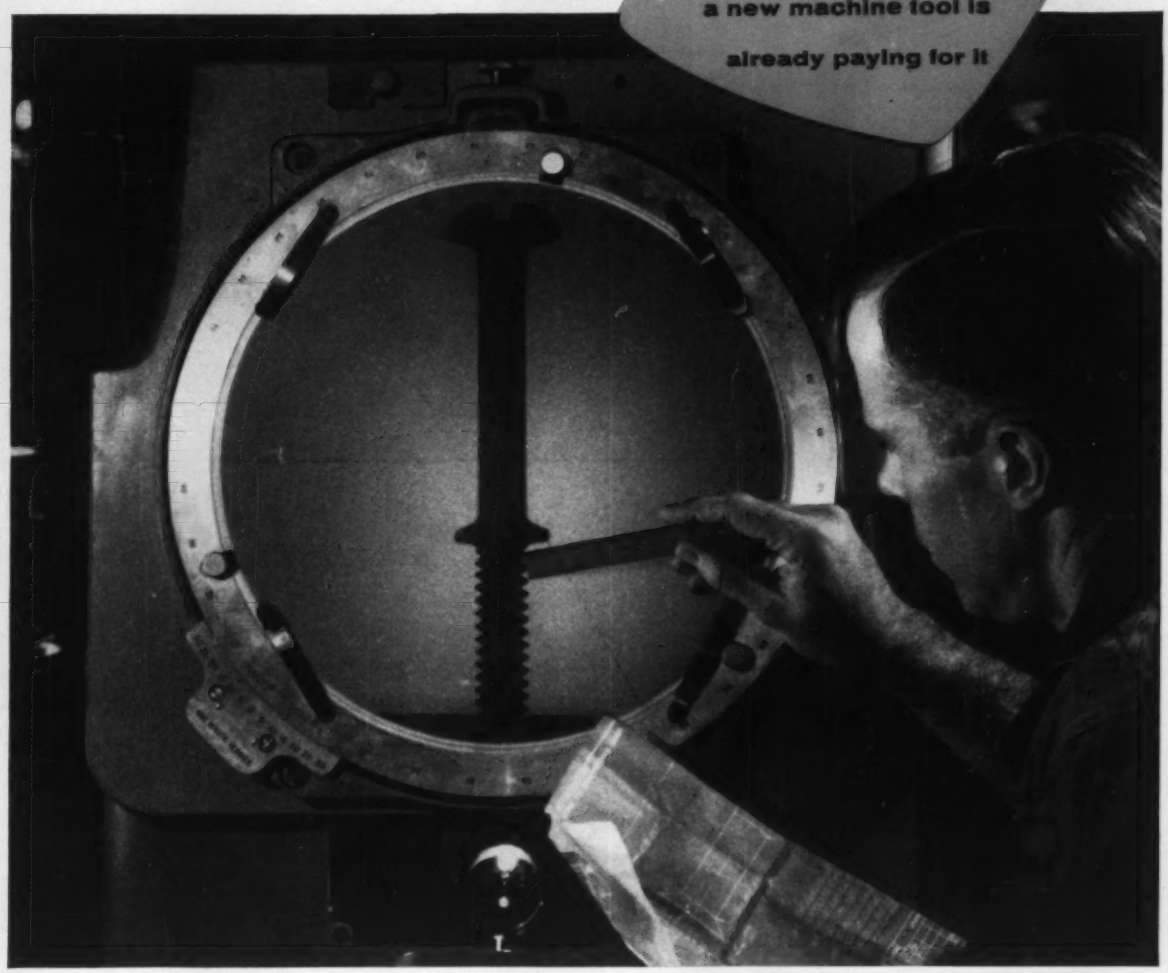
THREE high and low temperature shock and vibration isolators for electronic and industrial equipment handle static loads from ½ to 25 lb.

Isomode high and low temperature mounts retain effectiveness at continuous temperatures ranging

(*Please turn to Page* 208)

JONES & LAMSON
OPTICAL COMPARATORS

the man who needs
a new machine tool is
already paying for it



J & L Optical Comparator is a production tool

At John Hassall, Inc., Westbury, L. I., nails, screws, rivets, fasteners, and other small parts are "Job-Designed" to satisfy the customer whose requirements cannot be adequately met by the standard item.

Rigid AN (military) specicfiations are strictly adhered to whenever required. In all cases, the Jones and Lamson Optical Comparator has become an almost indispensable production tool.

In the cold heading process used at Hassall, the J & L Comparator acts as a monitor for controlling the essentials of the production process. *Tools* for manufacture of dies are checked for proper cutting edge and angle. *The dies* themselves are checked for cavity contour and angle by taking plastic impressions. *Finished parts*, accurately magnified 10 times under the critical eye of the Comparator, are checked at a glance for tolerances. But, even more importantly, this inspection gives essential information as to when and where dies may be worn, or where other areas of the *manufacturing process* should be changed. How easy it is for production control and tolerance requirements to be maintained!

J & L Comparators, featuring magnifications up to 250X are ready to go to work for you. Write for literature. Jones & Lamson Machine Company, 517 Clinton St., Springfield, Vermont.

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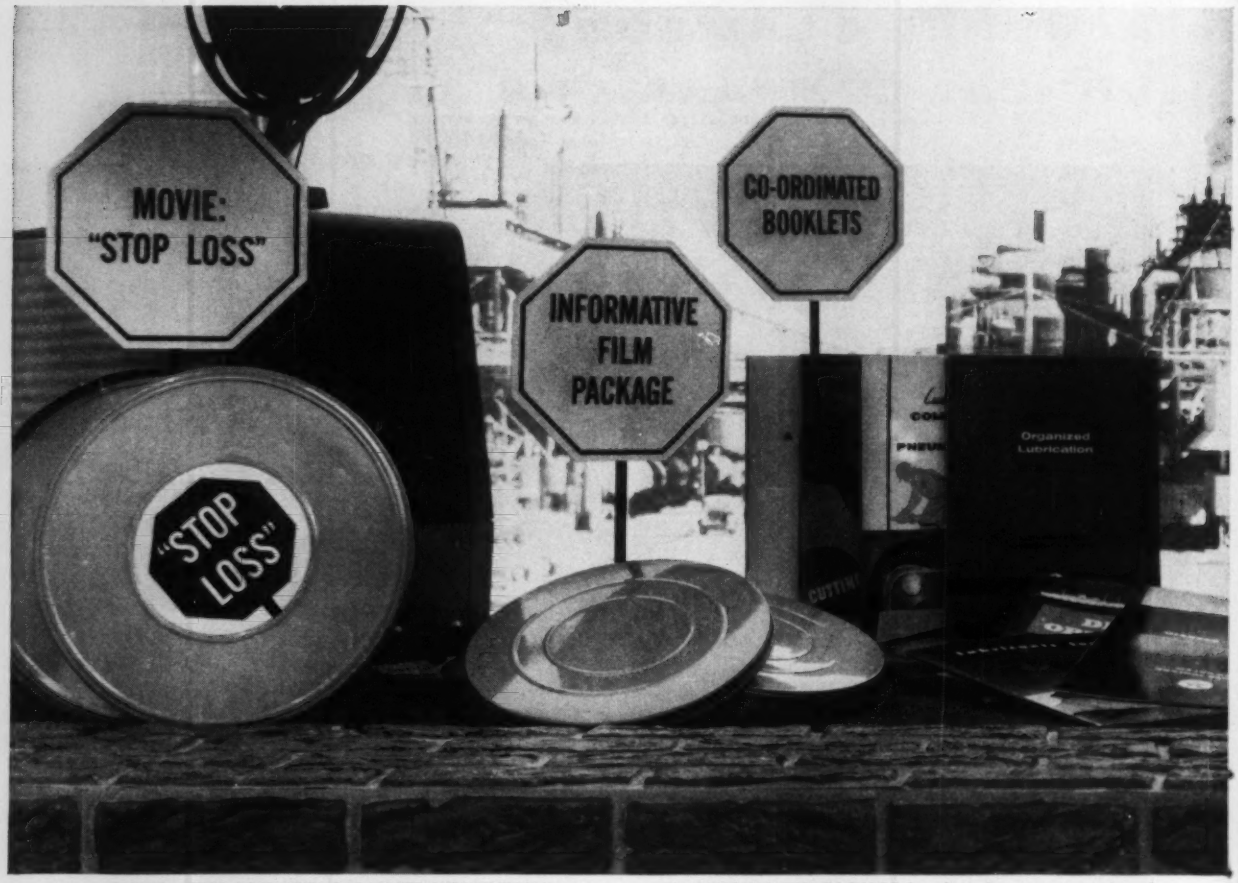


MOVIE: "STOP LOSS WITH ORGANIZED LUBRICATION," a new 20-minute color-and-sound film created to show the opportunities for cost control through Organized Lubrication.

EDUCATIONAL FILM PACKAGE for plant departments consists of movies on greases, hydraulic oils, cutting oils, etc., that may be selected after seeing the "Stop Loss" film.

HERE ARE THE TOOLS THAT CAN HELP YOU

INCREASE YOUR NET PROFITS

Texaco's new "Stop Loss" program is designed to cut maintenance costs by modernizing lubrication practices. If yours is an average plant, the results can add 4 per cent to your net profit.

Even if your plant is an efficient operation, it is still virtually certain that there is an opportunity for cost control you are overlooking—either partially or completely. Here's what the Small Business Administration says in a recent publication:

Suppose there is an average plant, which sells $1,000,000 worth of goods per year. The net profit of this average company would be $73,400 and the maintenance cost would be $29,900. Now, suppose that by *better lubrication*, maintenance costs are reduced 10%, or $2990, *the $2990 will go directly into profit*—an increase of 4%.

A Texaco "Stop Loss" Program is designed for you. Texaco has developed a program specifically designed to help cut your maintenance costs via better lubrication practices. It will help you increase machine life, minimize downtime, reduce lube inventory, even cut purchasing costs. And the savings you make go directly into profits.

CO-ORDINATED BOOKLETS on the film subjects and others can be used as guides in specific areas.

TEXACO LUBRICATION CONTROL SYSTEM takes the guesswork out of your lubrication scheduling. It costs almost nothing to install, yet can add thousands of dollars a year to profits.

BY AS MUCH AS 4 PER CENT!

Can your plant pass this test? If the answer is "no" to any of the following questions, it is almost certain that a Texaco "Stop Loss" Program can improve your profit picture.

1. Is there a central source of responsibility in your plant for *all* lubrication? Yes ☐ No ☐
2. Can your machine operators devote all their time to production without worrying about lubrication? Yes ☐ No ☐
3. Is there any system for making sure that equipment gets lubricated in the right spots at the right time? Yes ☐ No ☐
4. Have you had a lubrication study made to eliminate costly duplication of lubricants? Yes ☐ No ☐
5. Are your oilers qualified men with knowledge of mechanisms lubricated? Yes ☐ No ☐

See for yourself how "Stop Loss" works! Texaco has just released a new color-and-sound movie to dramatize the benefits of good lubrication practices. It's called "Stop Loss through Organized Lubrication" and we think it would be valuable to you to see it. For a showing in your plant soon, mail in the coupon today!

Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

MAKE YOUR RESERVATION TODAY!

TEXACO INC., Dept. S-160
135 East 42nd Street
New York 17, New York

I would like to see "Stop Loss through Organized Lubrication." Please call to arrange a showing in my plant.

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

TEXACO

(*Continued from Page* 204)

from −100 to 500° F. The units have two load carrying springs, mounted in opposed directions, with a built-in damper assembly to restrict resonant buildup.

For further information, *write* MB Electronics Div., Textron Electronics Inc., 781 Whalley Ave., New Haven 8, Conn. (Navy Pier Booth 504.)

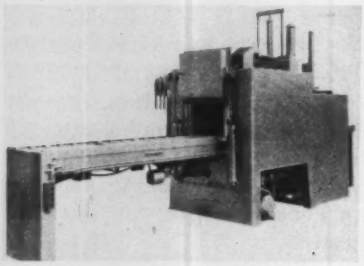
Drilling and Tapping Machines Introduced

PRECISION drilling machines introduced by Hamilton Tool Co. include the Varimatic, Maximus, Maxi-Jr, and A-M Super Sensitive units. The Super Sensitive precision tapping machine has also been announced. The Maximus drilling unit is available with a toolroom base and CTC compound table.

For further information, *write* Hamilton Tool Co., Hamilton, Ohio. (Amphitheatre Booth 486.)

Furnace Is Automatic from Load Through Quench

PRODUCTION line operations (where continuous, automatic, heat treating is required) are suited for the Clean-Line automatic heat treat furnace.



The unit makes possible step by step quality control for bright hardening, carburizing, carbonitriding, annealing, and normalizing. It's automatic from loading through quenching. With the simplified controls, only limited operator experience is required.

For further information, *write* Hevi-Duty Electric Co., a division of Basic Products Corp., Milwaukee 1, Wis. (Navy Pier Booths 368-370.)

Grinding Units Announced

TWO grinding machines are included among developments from Besly-Welles. Design of one unit, the TV 3, permits addition of heads for multiple grinding operations. Abrasive discs and tooling can be easily and quickly changed.

A vertical adaptation of the Besly horizontal grinding machine (DV 2) has automatic sizing, is easy to set up, and requires minimum floor space.

For further information, *write* Besly-Welles Corp., South Beloit, Ill. (Amphitheatre Booth 251.)

Gear Shaper Has Open Back, Two Column Design

ACCURACY and flexibility of operation are features of a Shear-Speed gear shaper (Model 3053). It's designed for automatic lines. The open back, two column design permits throughfeed and reduces cycle times.

A crowning gear grinder (Model CGG 16x18FA) is fully automatic, including the wheel dressing cycle. After a rough grind cycle is complete, the gear is automatically semi-finished and finish ground, with all grinding rates preset.

Other Michigan Tool developments include deburring and chamfering machines and an improved version of the Model 1537 Roto-Flo machine for cold rolling of toothed forms.

For further information, *write* Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. (Amphitheatre Booth 945.)

Transistors Are Used in Numerical Control Units

REQUIREMENTS for a numerical control system that is relatively inexpensive, simple to operate, and easy to maintain can be met by the transistorized Inductosyn, says the maker.

In addition to punched tape input for automatic operation, the system can be operated by manual input from rotary switch controls. The system can be applied to such machine tools as jig borers.

For further information, *write* Farrand Controls Inc., 4401 Bronx Blvd., New York, N. Y. (Navy Pier Booth 103.)

Instruments Designed For Gear Checking

THESE three instruments have been developed by Illinois Tool Works:

1. Helical, lead gear, measuring unit with a large screen, direct reading, optical setting device. Units are available in 12 or 24 in. diameter gear capacity and are equipped with integral, electrical recording or with separate, portable recording. A 15 in. diameter graduated disc is mounted directly to the sine bar and is accurate to ±1 second of arc. Reading is projected through the screen.

Involute, profile, checking lead checks gears to 200 in. base diameter

2. Variable, involute profile, measuring instrument that uses a master base circle segment which is always larger than the work to be checked. Slide motions are reduced and errors or lost motions of the unit are minimized in proportion to the work being checked.

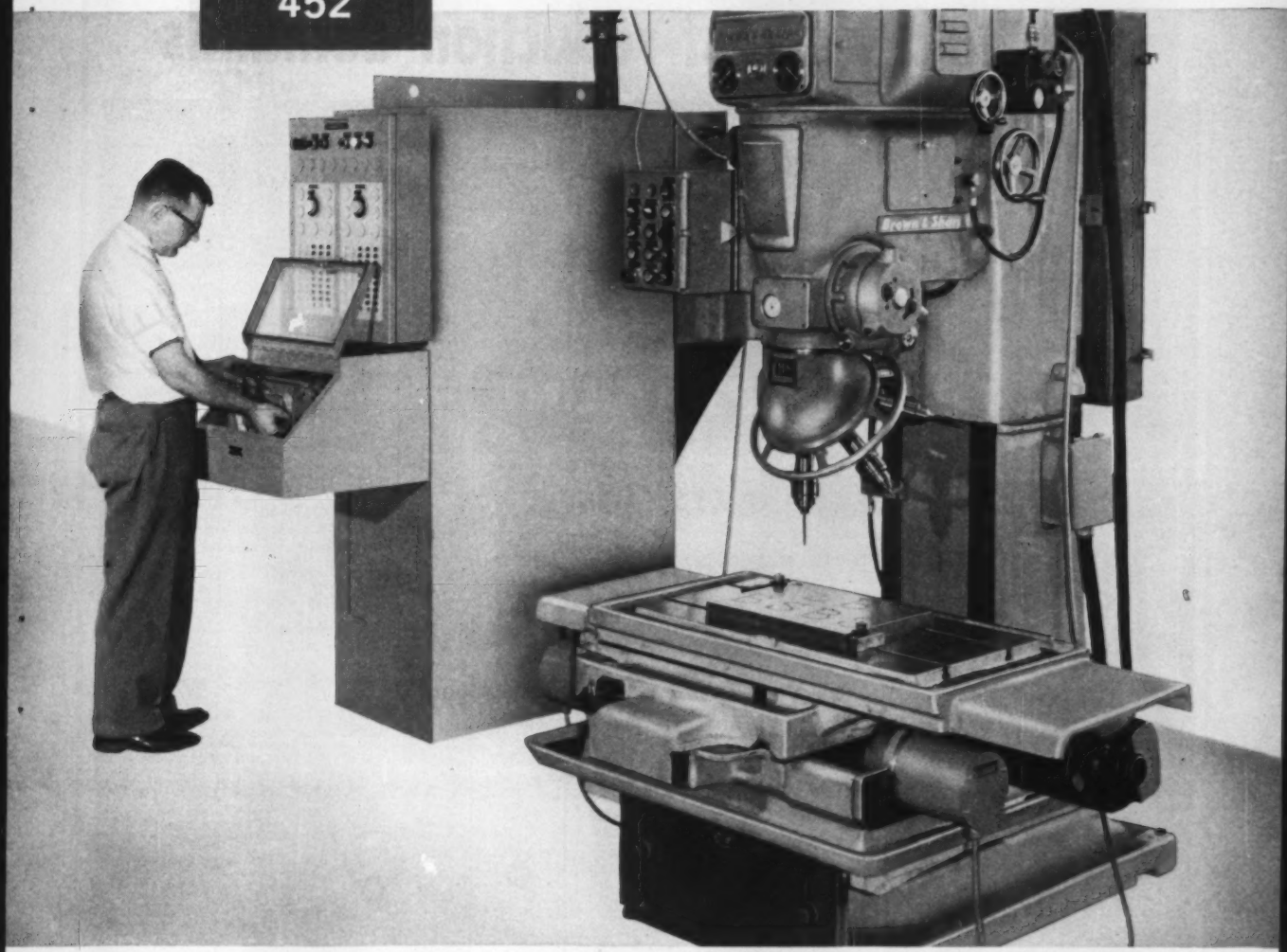
3. A 20 lb, involute, profile checking lead that's designed to locate directly in the gear teeth. It employs three ball feet. It can check any involute gear from 24 to 200 in. base diameter.

For further information, *write* Illinois Tool Works, 2511 N. Keeler Ave., Chicago, Ill. (Amphitheatre Booth 242.)

MMT-PE

See what's new at Booth 452

TO HELP YOU DRILL AND TAP MORE FOR LESS



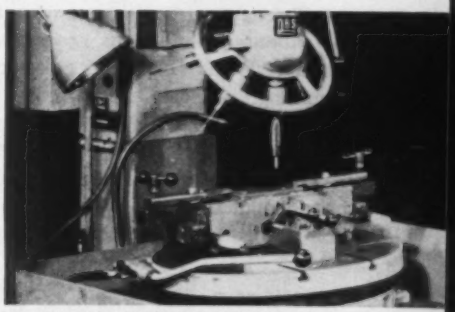
New B&S Model B Turret Drilling Machine with tape-controlled table.

New B&S tape-controlled Turret Drilling permits up to 75 to 1 reduction in tooling costs

Brown & Sharpe Turret Drilling Machines and Work-Positioning Tables regularly score production gains as high as 5 to 1 over conventional gang-drill box-jig methods, with manual or automatic operation. Now, tape-control adds tooling cost savings as high as 75 to 1.

This revolutionary advance in automation of drilling, tapping, reaming, and boring is on view in Booth 452. Completely automatic, fully integrated locating and machining operations are performed by the B&S Model B Turret Drilling Machine and the B&S Work Positioning Table, guided by a tape control.

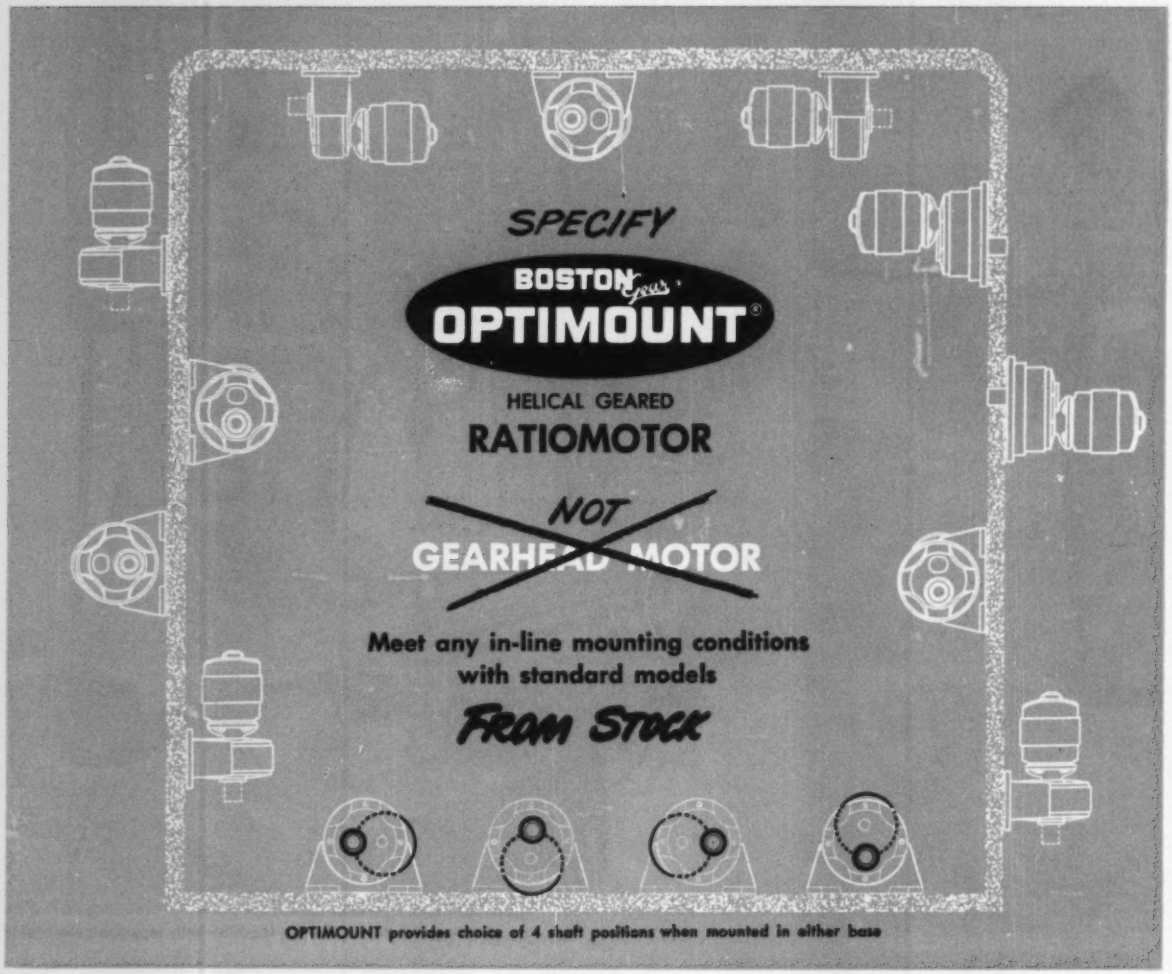
Plan now to see this dramatic demonstration if you attend the Exposition . . . or write for details: Machine Tool Division, Brown & Sharpe Manufacturing Company, Providence 1, Rhode Island.



Manually operated Model A B&S Turret Drilling Machines and Positioning Tables provide jig-less drilling at low cost.

Brown & Sharpe PRECISION CENTER

How to keep in-line drives in line with today's cost-reduction demands



Advt. copyright by Boston Gear Works

OPTIMOUNT Ratiomotor adaptability opens up endless opportunities for highest efficiency in drives once restricted by the mounting limitations of gearhead motors. With OPTIMOUNT optional mounting, you can choose from 456 combinations and get the arrangement you want, ready to install, FROM STOCK.

You can order horizontal or vertical base mounted — with any shaft position needed — for any floor, wall, or ceiling mounting position. Any size you need, with single or double helical gearing, for 1/6 to 10 hp drives. Motor is readily detachable, can be changed in minutes. You can also order OPTIMOUNT without motor, if desired, ready for attachment of motors you have purchased separately.

Get complete information. Ask for Catalog No. 57. Boston Gear Works, 73 Hayward St., Quincy 71, Mass.

ORDER FROM YOUR LOCAL DISTRIBUTOR
Get OPTIMOUNT arranged as specified, READY TO INSTALL
FROM STOCK!
at factory prices

Vertical base mounted

Horizontal base mounted

CALL YOUR NEARBY **BOSTON Gear DISTRIBUTOR**

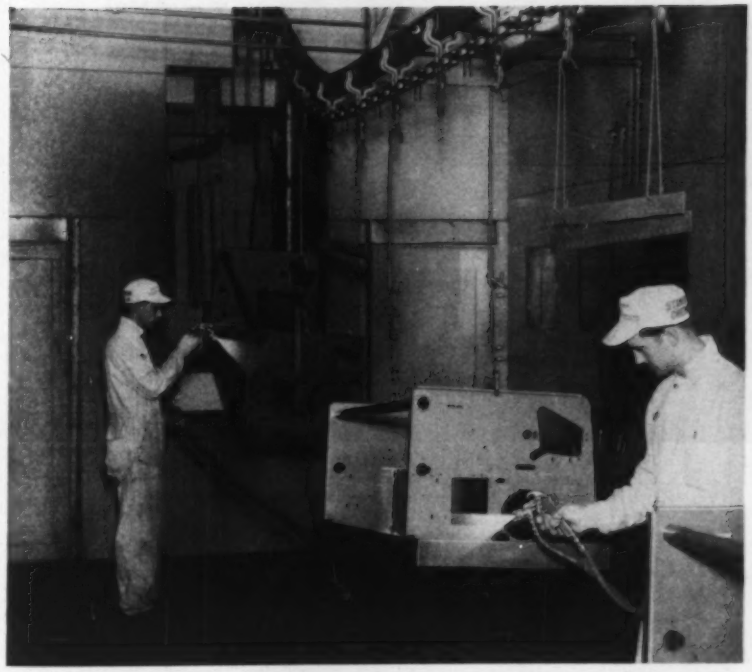
— *STANDARDIZATION PAYS* —

Exhibitors At 1960 Machine Tool Shows

The Machine Tool Exposition —1960 and the Production Engineering Show will run from Sept. 6 through Sept. 16; the 2nd Coliseum Machinery Show will run from Sept. 7 through Sept. 15. All shows will be closed Sunday, Sept. 11. The Amphitheatre will be open from 10 a.m. to 5:30 p.m. daily; the Navy Pier hours are from 1 p.m. to 10 p.m. The Coliseum will be open daily from 1 p.m. to 10 p.m.

THE MACHINE TOOL EXPOSITION—1960
International Amphitheatre

Chas. G. Allen Co. 148
Size Control, Walsh Press & Die Divs., American Gage Machine Co. 1120
Elmes/King Div., American Steel Foundries 1406
Thirteen machines: boring mills with pendant controls; manual mill; small hydraulic presses; 400 ton bulldozer; hobbing press; track link assembly press.
American Tool Works Co. 381
Combination numerically and tracer controlled engine lathe; preselect engine lathe; numerically controlled, traveling, 19 in., open side boring and drilling machine.
Anderson Oil & Chemical Co. Inc. 1531
Armstrong-Blum Mfg. Co. 1340
AUTOMATION—a Penton publication 1509
Atlantic Machine Tool Works Inc. 543
Baird Machine Co. 1142
Automatic milling machine (6000 parts an hour).
Industrial Equipment Div., Baldwin-Lima-Hamilton Corp. 1226
Barber-Colman Co. 923
2½-4 hobbing machine; 4-6 hobbing machine; 16-6 multicycle hobbing machine; NC lathe.
Bardons & Oliver Inc. 741
W. F. & John Barnes Co. 641
John S. Barnes Corp. 641
Barnes Drill Co. 152
Three honing machines; high capacity mechanical drill; pressure type, immersed drum filter.
Beatty Machine & Mfg. Co. 243
Stamper; rotary shear.
Besly-Welles Corp. 251
Late developments in high production, disc grinding machines.
Blanchard Machine Co. 1209
Surface grinders, grinding wheels, accessories.
E. W. Bliss Co. 1325
Four, Model C inclinable presses; new high production press; high speed inclinable (1200 strokes per min.); 400 ton aluminum extrusion press; precision piercing and positioning machine; 35 ton, gap frame hydraulic press for flash trimming; working models of large presses illustrating welding type and the rolling bolster press.
Bodine Corp. 828
Double ended continuous tapper; a model 41-20 to make squeeze-type B-X connectors; also a wide range of spindle equipment.
Brown & Sharpe Mfg. Co. 452
New, No. 2 milling machines; deep hole drilling machine; tape controlled cam mill; two large surface grinders; Micromaster slicing and dicing machine; No. 5 plain grinder with Ceda-Size equipment; new accessories and attachments for screw machines; turret drilling machines.
Bryant Chucking Grinder Co. 936
Two, Model "C," Centalign internal grinders; two, Model B internal grinders.
Buffalo Forge Co. 551
No. 400 billet shear; hollow spindle RPMaster drill; Buffalo bending roll; No. 1/2 universal iron worker.
Buhr-Sidney Machine Tool Co. 1440
Two-way and three-way multiple operation



In the new Charles Bruning Co., plant...

a finishing department where efficiency is king

In equipping their new plant in Mount Prospect, Illinois, Bruning took full advantage of the opportunity to build new efficiencies into every manufacturing step.

Working closely with Bruning engineers, Binks designed a spray finishing system in keeping with every other advanced process incorporated into the plant.

The finishing system is completely flexible! The combination of conveyorized handling and manual spraying accommodates any product size, in any sequence. Each model color is readily available to the painters ...and with efficient overspray removal provided by the spray booth exhaust system, several colors can be sprayed simultaneously without fear of drift. Air entering the spray booth is filtered and the volume is greater than the air exhausted. This keeps the painting area completely free of dust and improves finishing quality. Health and housekeeping standards are also high.

Free planning service

During the past 65 years, Binks has designed and installed finishing equipment for thousands of companies, painting and coating countless products. This experience plus a complete line of finishing equipment is available for application to your needs. It doesn't cost a penny to talk to a Binks engineer...it may save you thousands of dollars.

Ask about our spray painting school
Open to all...NO TUITION...covers all phases.

0790

Binks
EVERYTHING FOR SPRAY PAINTING

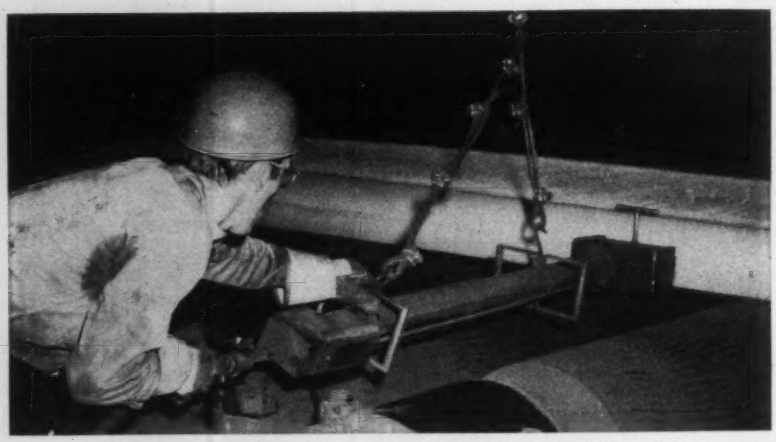
SPRAY GUNS

AIR COMPRESSORS

NATIONWIDE SERVICE

Binks Manufacturing Company
3122-30 Carroll Ave., West, Chicago 12, Illinois

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY



This worker at the Coatesville, Pa. plant of Lukens Steel Company is using a Pannier Marker equipped with the newly-designed magazine-style marking head to stamp hot slabs with an identifying number.

Hot Steel Marking by controlled impact

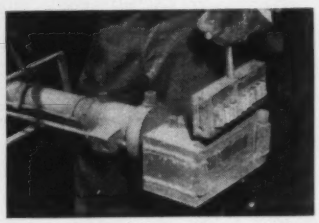
Uniformly clear stamping of heat or ingot numbers on billets or slabs, or serial or part numbers on hot forgings is provided by Pannier Single Stroke Pneumatic Markers.

The operation is positive, fast and automatic. The worker, standing comfortably back from the heat, is able to position the marking head accurately against the steel. The hammer first aligns itself, trips itself and makes the impact automatically.

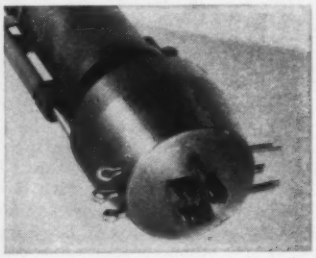
The new head shown here incorporates a fast-change typeholder that permits users to change entire type set-ups quickly, easily and safely. Pre-set type is now economically possible. In just a few seconds, a spare type magazine with an all-new type set-up can be inserted into the marking head. Pre-setting type prevents costly down-time for changes.

The type magazine is made to accommodate lines of interchangeable characters positioned to your specifications. The type is held secure in the magazine by Pannier's sure-safe locks...spilling danger is eliminated.

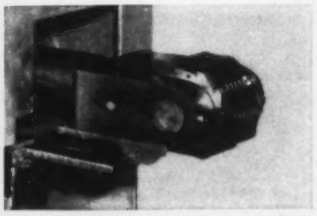
Pannier engineers will be glad to consult with you on hot steel marking. For complete information, write



This fast-change stamping head shown in operation above uses a type magazine. By the use of spare magazines for type changes, a new set of numbers can be dropped in place in seconds.



Hardened type is easily released for change in this style Pannier marker head by sliding out the pins. This head is effective where numbers are repeated on several pieces.



Pannier markers are now available for automated operation for larger billets and slabs. This numbering head contains a series of number wheels, rotated and set by push button, tape or card control. The entire marking operation can be completed by programmed remote control.

MASTER PANNIER MARKERS

PANNIER MASTER MARKERS
220 Pannier Building, Pittsburgh 12, Pa.

EXHIBITORS

machine tools; units for machining tractor transmission housings; hydraulic way-type feed.

Burg Tool Mfg. Co. Inc. 834
Turret drilling, tapping, and boring machines; hydraulic turret drills; three, manually operated Burgmaster machines; two, tape controlled machines (planer and drill).

Carlton Machine Tool Co. 849
Two tape controlled drilling and boring machines; small, horizontal drilling and boring machine; and five radial drills.

Chilton Co. 1536

Cincinnati Lathe & Tool Co. 934
Four, tape controlled machines: Numerically controlled lathe; three, tape controlled drills.

Cincinnati Milling Machine Co. Mach. Tool Div., Products Div. 928, 1027, 1034
No. 1, 2, and Monoset cutter grinders; Toolmaster milling machines: Toolmaster, Univ. M.I., vertical dial type, vertical, dual power, Vercipower, R&F Powermatic, R&F HyPowermatic, T.C. HyPowermatic, Contourmaster, Vertical Hydrotel; automatic cutter grinder; Grinders: 107-4, 220-8, 340-20 centerless, 10 x 24 and 18 x 72 Universal, two plain types, 30 degree A.W.S., No. 0 & 1 Micro-Centrics, No. 2 chucking, superprecision pl.; Specials: 10/66 vert. dupl. broach, 16 in. N.C. Vert. Hydrotel, Grumman profiling machine; two Electrojets; a Hydroform and an H200 Intraform.

Cincinnati Shaper Co. 1230
All steel shears; press brakes; duplicating shaper; hydraulic shear; high speed shear.

Cleereman Machine Tool Corp. 632

Cleveland Automatic Machine Co. 900
Bar and chucking automatic; Model AB Dialmatic; Model AW, single spindle automatic; Model B, automatic shaft machine.

Cleveland Crane & Engineering Co. 814
Mechanical press brake, hydraulic press brake, mechanical shear, speed-draw press.

Cleveland Hobbing & Machine Co., a division of Textron Inc. 642
Cleveland modular machines which combine to form profile lathes, turret lathes; pedestal, automatic bar and chucking production, and various other combinations. Also hobbing machines, hard tooth finishing machines, chip breaker and tool booster; data transcutter.

Colonial Broach & Machine Co. 241
Twin ram, pull down broaching machine; utility type, pull down broach; broach grinder; tracer controlled contour mill; universal indexing table.

Cone Automatic Machine Co. Inc. 1215
Two, modern, fully automatic production lathes—QF Bar Conomatic and KU Conomatic pilot lathe.

Covel Mfg. Co. 332
Production cylindrical OD grinder (42A) with automatic sizing; 10P hand feed surface grinder with power assist; No. 30 comparator.

Danly Machine Specialties Inc. 1250
Automatic, coil fed press and auxiliary equipment; 100 ton OBI press; 100 ton hydraulic piercing machine; operating models of underdrive presses; accessories.

Davis & Thompson Co. 146

Denison Engineering Div., American Brake Shoe Co. 914
Twenty-five ton, hydraulic, servodriven, high speed stamping press; floor model compacting press (1 ton) plus 12 other presses ranging from 1 ton to 75 tons, including demonstration of a hydraulic, six station index table with clear plastic parts to illustrate oil flow.

DeVlieg Machine Co. 431
"H" series Jigmils with direct dial dimensioning; Tapac tape control system; Micropoint tool grinder.

Dreis & Krump Mfg. Co. 1134
Chicago hydraulic and mechanical press brakes and tooling.

Eastern Machine Screw Corp. 745
Abrasive belt grinder; threading machine; thread roller; automatic screw driver; life of insert chaser die heads; miniature solid adjustable die.

Edlund Machinery Co., a division of Harsco Corp. 531
Edlund-matic, a layout drilling machine with numerical control tape and dial input.

Ekstrom, Carlson & Co. 846
Three dimension, continuous path, tape controlled milling and profiling machine.

Ex-Cell-O Corp. 946
Standard vertical precision bore; groove grinder; four boring machines; electrospark machine; electrolytic tool grinder; large precision boring machine; Model 308 cam bore; precision boring machine; numerical control; small, multiple spindle, precision boring machine; six contour projectors; noncontact tracer.

Famco Machine Co. 331
Numerically controlled mill; hydraulic press; heavy duty power squaring shear.

Fellows Gear Shaper Co. 929
Two gear shapers; 1 gear finisher; gear hob-

(Please turn to Page 218)

Two advanced -Verson- processes combined to provide more efficient production of machined parts.

In a perfect blending of two of metalworking's most efficient production processes, Verson has developed the Transmat-Impact Machining Press. It utilizes the Transmat principle of mechanical fingers to move the piece part from one station to the next. It also utilizes the cold extrusion principle of Impact Machining to form in two strokes of the press a part that previously had to be machined from a piece of solid bar stock by metal removal processes.

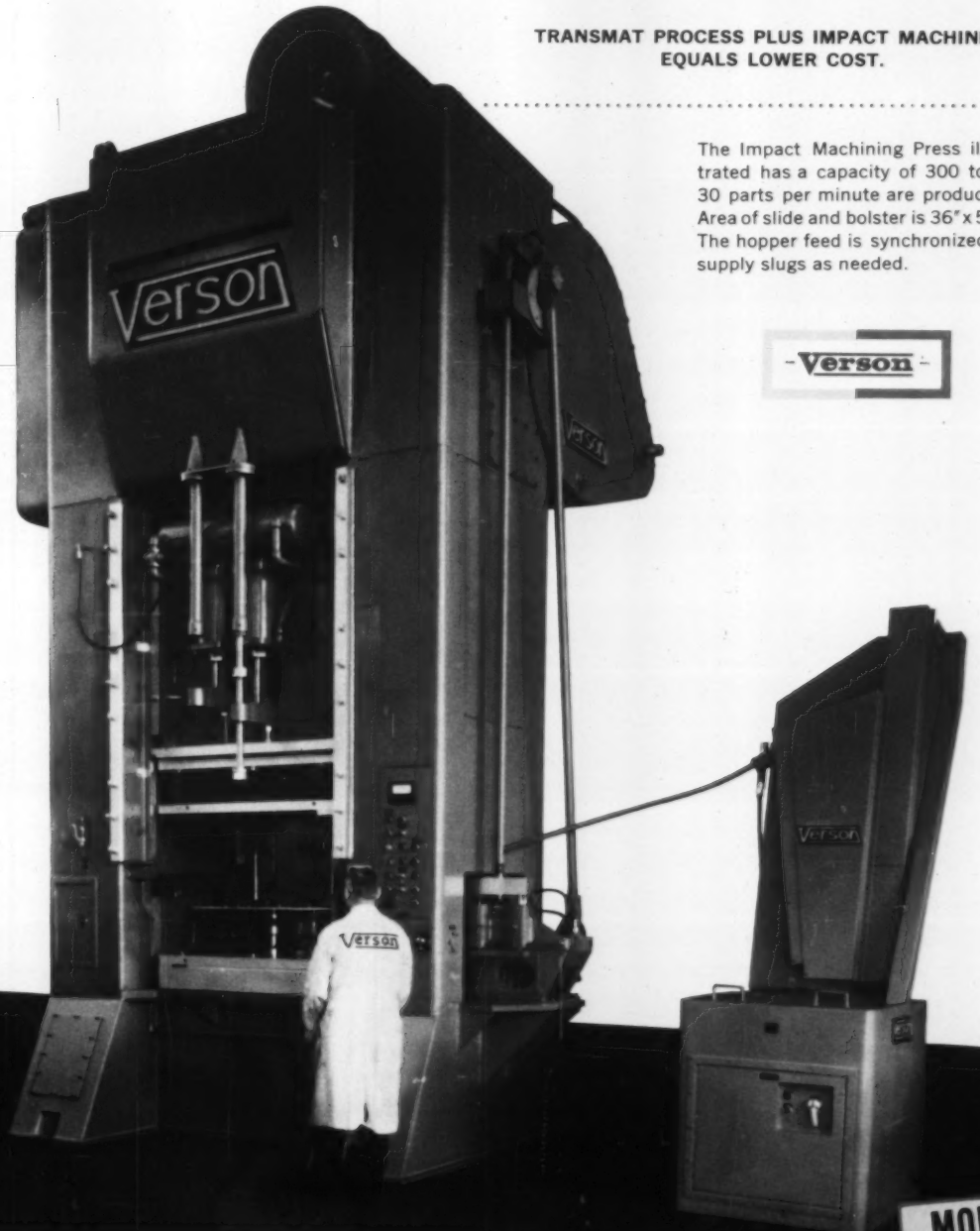
The part formed is the master cylinder for automotive brake systems. One Transmat-Impact Machining Press produces them at the rate of 30 per minute and replaces a bank of automatic screw machines. Material consumption is reduced by 47%. Impact Machining completely finishes the bore, ready for installation, and produces a significantly stronger part.

If you produce machined parts in quantity, you owe it to yourself to investigate Impact Machining and Transmat-Impact Machining. For full information and recommendations, send an outline of your requirements.

TRANSMAT PROCESS PLUS IMPACT MACHINING EQUALS LOWER COST.

The Impact Machining Press illustrated has a capacity of 300 tons. 30 parts per minute are produced. Area of slide and bolster is 36"x54". The hopper feed is synchronized to supply slugs as needed.

-Verson-



See Metalworking's most advanced production processes in action at the Verson factory, September 6-16.

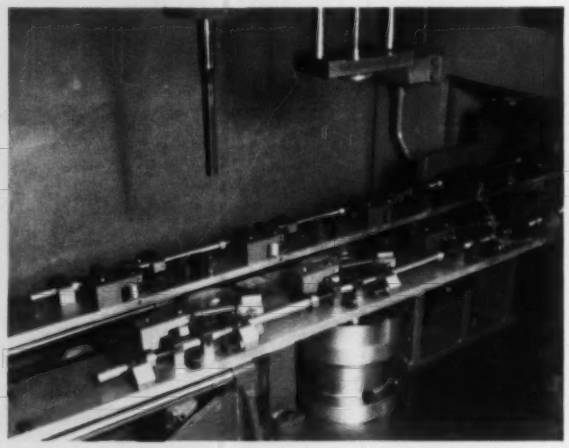
MORE!
Turn the page, please . . .

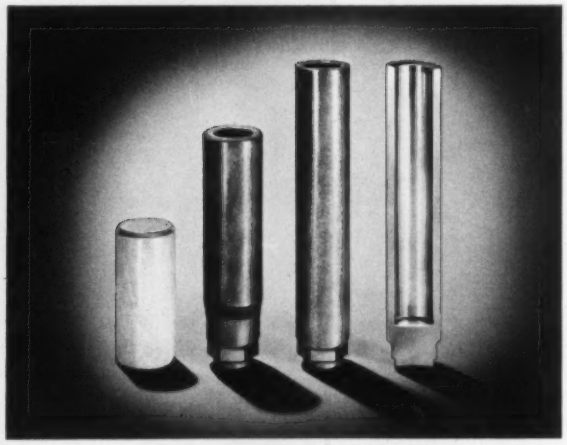
AT -Verson- THE PROCESS IS MORE IMPORTANT THAN THE PRESS

TRANSMAT FORMING, originated and pioneered by Verson, utilizes synchronized mechanical fingers to move the piece-part from one station to the next fully automatically. Below is a close-up of the die space of the press shown on the reverse side of this page. Mechanical fingers pick up the slug and move it into position for the first operation. At the completion of that operation the fingers move it for the second operation and then to discharge. Transmat forming may be used for a wide variety of formed and drawn parts, as well as for Impact Machined parts. Production rates run as high as 2880 pieces per hour. Draws as deep as 10″ have been made by the Transmat process.

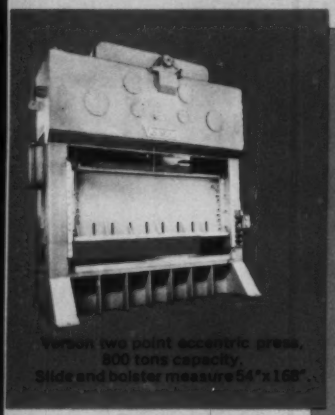
IMPACT MACHINING, a Verson development, is the cold working of steel and other metals by applying pressure with formed tools to create plastic flow. By producing in a press parts that would normally be made by forging or metal removal processes it is often possible to use lower cost materials . . . to reduce material consumption . . . to reduce machining requirements and to reduce materials handling costs.

Shown below are the various stages in the Impact Machining of the automotive master brake cylinder described on the reverse side of this page. The process starts with a coated slug; two press strokes form the part. A simple trimming operation completes it.





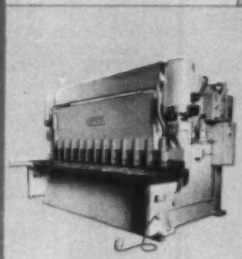
OTHER VERSON PRODUCTION PROCESSES ARE BUILT AROUND PRESSES LIKE THESE



Verson two point eccentric press, 800 tons capacity. Slide and bolster measure 54"x 168".

Verson No. 10-F O.B.I. rated at 215 tons normal operating tonnage, 250 tons maximum operating tonnage; equipped with optional flanged slide.

Typical straight side hydraulic press. This model has a capacity of 800 tons.



Model HS-750-12 shear with a capacity of ¾" x 12'.

Verson Press Brakes are made in a complete range of sizes and types for all requirements.

See Metalworking's most advanced production processes in action at the Verson factory, Sept. 6-16.

IMPACT MACHINING • MOVING BOLSTER PRESSES • DUAL SPEED PRESS BRAKES • COLD EXTRUSION • TRANSMAT FORMING • DOUBLE ACTION PRESSES

Verson

VERSON ALLSTEEL PRESS CO.

9300 S. Kenwood Avenue, Chicago 19, Illinois • 8300 S. Central Expressway, Dallas, Texas

OHIO RUBBER

"CUSTOMEERED COMPONENTS BASIC TO INDUSTRY"

STAINLESS STEEL JEWELS
make facsimiles by the million!

OHIO RUBBER can, and regularly does produce 100,000 *identical* rubber parts per day from one set of production tooling. The jewel-like precision of the self registering molds shown above—actual size—is a key factor in ORCO's high speed, high accuracy, continuous molding process.

AUTOMATIC INTEGRATION of processing steps which are usually handled separately eliminates variables—provides precise control for achieving the ultimate in product uniformity. RUBBER PARTS up to 1½″ in diameter and 1″ in thickness produced by this process are distinguished by uniformity, minimum flash and precision tolerance of ± .003″.

QUANTITY REQUIREMENTS involving not less than 500,000 parts proves best for this new process.

"**DO YOU** use small precision molded rubber parts by the million?", if so, the full story of ORCO "CUSTOMEERED" Continuous Molding is yours via free Bulletin CM-100. Send for your copy today to see how custom molded, precision rubber parts can be produced in volume—at less cost. MP-160

ORCO

THE OHIO RUBBER COMPANY

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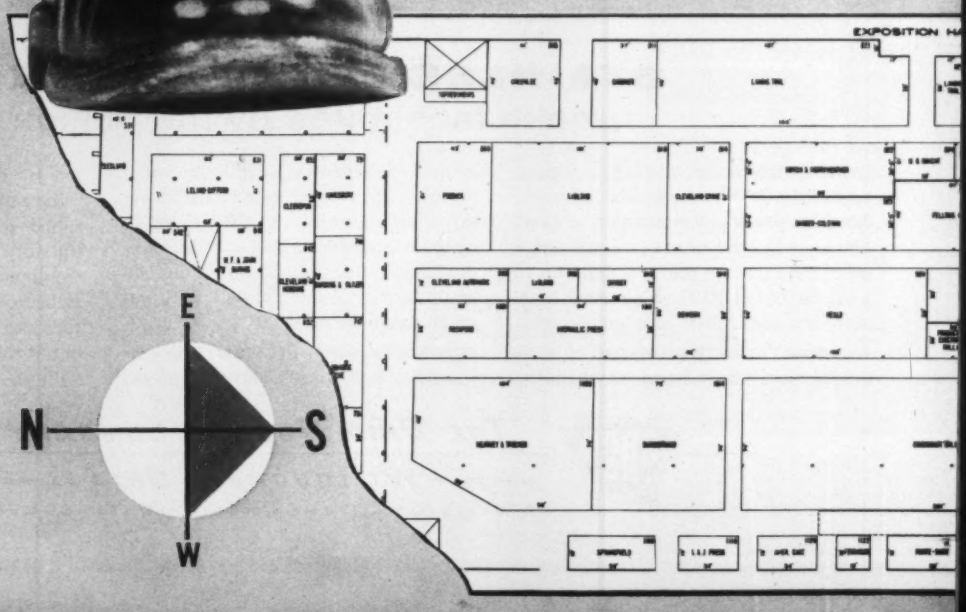
point

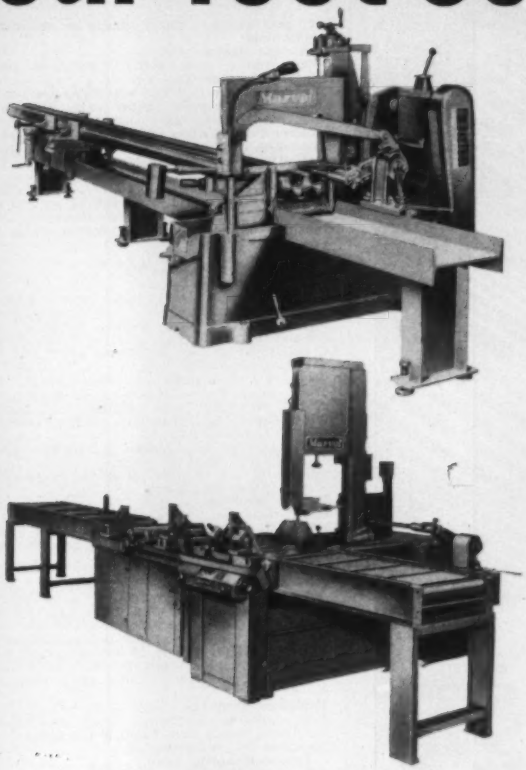
Don't take metal sawing for granted! There is more opportunity to save money in cutting off operations today than ever before. To see why, make 1340, the **MARVEL** space location in the Machine Tool Exposition a **sure** stop when you're in the Amphitheater.

Tons of steel will be cut-up by 14 **MARVEL** Hack Saw and Band Saw Machines in the largest sawing demonstration ever made — anywhere or at anytime. Among other things, you will see the most important development in metal sawing — the **MARVEL** "Sure-Line" Automatic Accuracy Control.

Finally, if you have a specific sawing problem, we can prove to your satisfaction, that **MARVEL** Saws are designed and built to outperform any other saw on the basis of speed, accuracy, and cost per cut.
Come in and see!



your feet south to space



1340

to see the LARGEST, MOST
COMPLETE SAWING DEMONSTRATION
in the Amphitheater

Be sure to see the
MARVEL *"Sure-Line"* (patented)
AUTOMATIC ACCURACY CONTROL

MARVEL *Metal Cutting* **SAWS**
Better Machines–Better Blades

ARMSTRONG-BLUM MANUFACTURING COMPANY

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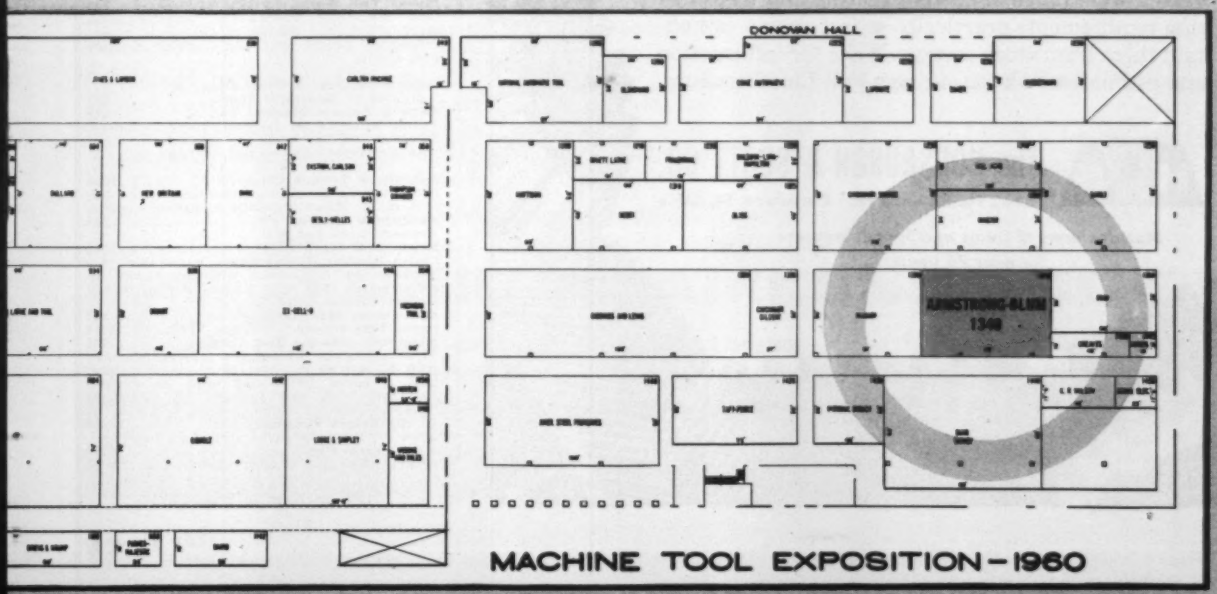


MACHINE TOOL EXPOSITION – 1960

CAPACITY FOR FAST DELIVERY ON CUSTOM REQUIREMENTS

SPUR-HELICAL-WORM-HERRINGBONE-BEVEL LARGE INDUSTRIAL GEARS and SPEED REDUCERS

Horsburgh & Scott maintains one of the industry's largest stocks of patterns . . . special tooling and special equipment—enabling us to engineer and produce a wide range of custom gearing and transmission requirements practically as fast as you can obtain them from stock sources. Write for information and estimates. Ask for our new Full Line Brochure.

H&S **The HORSBURGH & SCOTT CO.**

5112 Hamilton Ave. • Cleveland 14, Ohio

Manufacturers of Gears and Speed Reducers for over 75 years

EXHIBITORS

(*Continued from Page 212*)

ber; gear grinder; cutter sharpener; measuring instruments.

Ferracute Machine Co. 1122
Single geared, steel, O.B.I. mechanical press.

Fosdick Machine Tool Co. 800
Precision boring machine with tape control; jig borers and grinders; three axis, 32 spindle turret drill; two axis drill with numerical control; two sensitive drills with variable speed transmission or gear transmission; radial drills.

FOUNDRY—a Penton publication 1509

Fraudenthal Div., Kaydon Engineering Corp. 1229
Standard and custom machines for contour and conventional grinding, turning, boring, drilling, finishing, milling, recessing, counterboring, and similar machining.

Gallmeyer & Livingston Co. 751

Gardner Machine Co. 811
Seven precision disc grinders with automatic functioning controls.

Metallurgical Products Dept., General Electric Co. 1539

Geometric Tool Co., a division of United Greenfield Corp. 345

Giddings & Lewis Machine Tool Co. 1320
Three in. spindle jig borer and milling machine; magnetic, tape controlled, horizontal die sinking and contour milling machines (DiMil); exhibit of 15 machines, including horizontal, 5 in. spindle horizontal boring, drilling, and milling machine; radial drills; upright drills; vertical turret lathe, and controlled positioning table.

Gisholt Machine Co. 1042

G. A. Gray Co. 1350
Universal planer; Flying Scot universal planer; horizontal drilling and milling machine with space setter.

Greaves Machine Tool Div., J. A. Fay & Egan Co. 1439
Scan-O-Matic milling machine.

Greenerd Arbor Press Co. 541
Hydraulic expanding machine; heavy duty, hydraulic bench press; HP-D-4 self-contained, 4 ton hydraulic press; 15 ton hydraulic press with straightening table; PD-440 guided platen, 40 ton hydraulic press; 3 ton arbor press.

Hamilton Tool Co. 486
Gear hobbing machines, small hole drilling machines, small hole tapping machines.

Hannifin Co., a division of Parker-Hannifin Corp. 652
Nine, high speed hydraulic assembly and trimming presses for pressing backup washers on leakproof fittings and trimming diecastings; several models of hydraulic punching and riveting equipment; air presses.

Heald Machine Co. 924
Precision grinding and boring machines; numerically controlled drill; miniature internal grinder; two Bore-matics (one with numerical control); and a tool sharpening machine.

Hill Acme Co. 1240

Hitchcock Publishing Co. 1506

E. F. Houghton & Co. 1538
Supplies of coolants, lubricants, rust preventive, hydraulic fluids, and cleaners.

Hydraulic Press Mfg. Co., a division of Koehring Co. 1011
Hydraulic, triple action blanking press; 200 ton blankholder press; Henry & Wright dieing machines; C-presses; index table; valve and cylinder display.

Illinois Tool Works 242
Gear measuring instruments; portable gear, involute unit and production gear hand roller; redesigned helical lead and variable involute instruments.

Johnson Machine & Press Corp., a division of Bontrager Corp. 352

Jones & Lamson Machine Co. 839
Turret lathes; form grinders; thread grinders; precision boring machine; positioning table with 8-channel tape control; various tools.

Kearney & Trecker Corp. 1008
Nine, knee type milling machines; three bed type mills; Milwaukeematic numerical control.

Kempsmith Machine Co. 347
Kempsmith master mill.

Kennametal Inc. 1500
Dial-A-Breaker tooling with adjustable chip breakers; milling cutters with throwaway inserts; some tools with indexable inserts; titanium carbide K165.

Kent-Owens Machine Co. 547

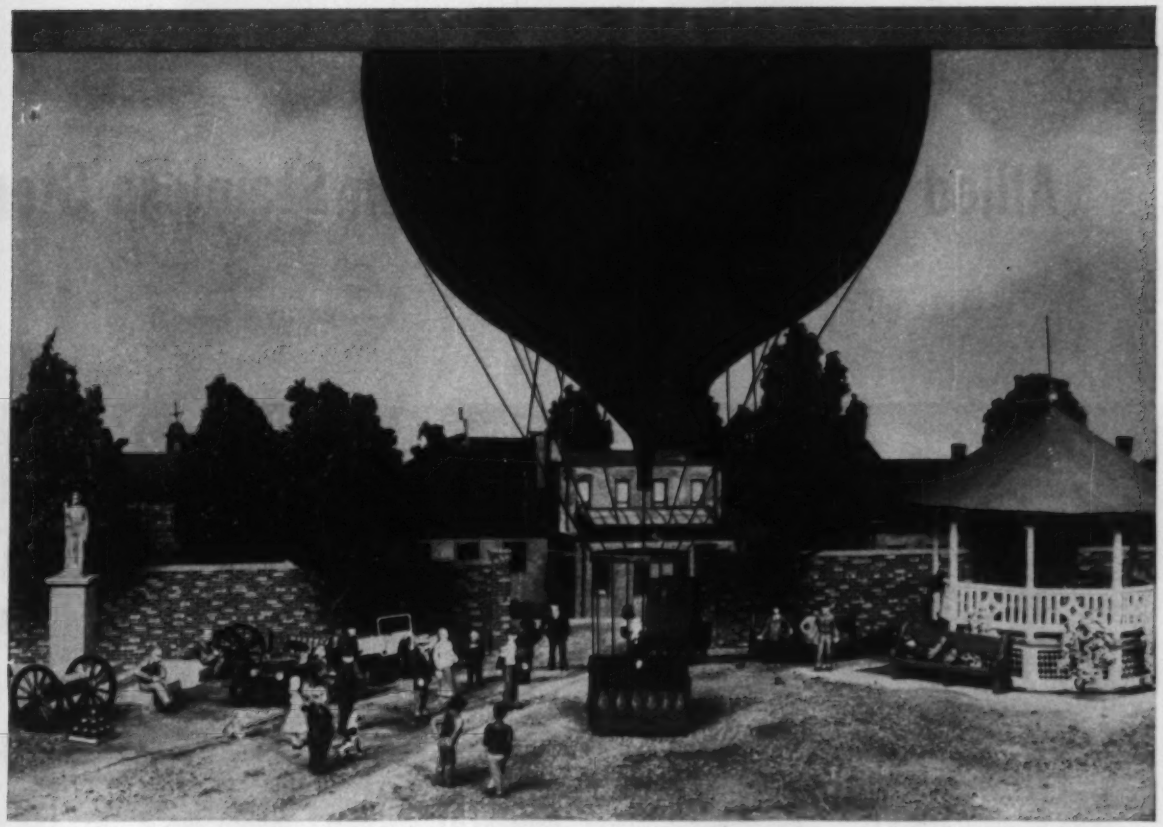
Kerns United Corp. 1511

Kingsbury Machine Tool Corp. 731
Three automatic drilling and tapping machines with 63 in., 40 in., and 20 in. index tables; also, a model 168 boring head, an angular feed drill head, and a model 167 oscillating head.

W. B. Knight Machinery Co. 824
Model 65, numerically controlled jig borer.

L & J Press Corp. 1116
Seventy-five ton, double crank, gap frame

(*Please turn to Page 222*)



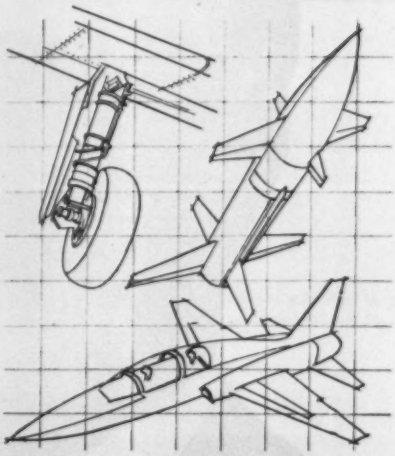
Are you up in the air over tubing sources?

If you have ballooning production problems, consider these important facts. OSTUCO Tubing is always the exact tubing you need for your product because OSTUCO Tubing is CUSTOM MADE for your product. Your order is manufactured to your own specifications to produce steel tubing especially for your application — the precise grade, analysis, size, shape, special anneal and tolerances best suited to your needs.

Ohio Seamless Tube produces both seamless and electric welded steel tubing — is prepared to form many finished or semi-finished tubular parts to your designs.

To get the most from your next steel tubing order, use Custom Made OSTUCO Tubing. Contact your nearest Ohio Seamless representative, or send part drawings to the plant at Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.

A-2449A



Model illustrated built to 3.5 mm scale.

OSTUCO SHELBY, OHIO

OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago, [illegible], Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Kansas City, Los Angeles (Lynwood), Miami, Moline, New York, New Orleans (Chalmette), Philadelphia (Wynnewood), Pittsburgh, Richmond, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita

CANADA: Railway & Power Engr. Corp., Ltd. • EXPORT: Copperweld Steel International Company, 215 Broadway, New York 7, New York

Allied Metals' fast service on Stainless Steel

Walter Miller, President of Allied Metals, Inc., Houston, Texas, believes that service is the key to successful steel warehousing. His customers for Stainless Steel are fabricators for the petroleum and petro-chemical industries along the Gulf where emergencies demand quick service, day or night. Allied Metals usually delivers Stainless Steel plates, cut to size, in 24 hours or less.

To be sure of delivering just what a customer needs when he wants it, Mr. Miller maintains a sprawling 25,000 square foot "lumber yard" of Stainless Steel and other metals. Over 350,000 pounds of plates are kept on hand at all times. In addition to Stainless Steel sheets, plates, piping and tubing in various alloys and sizes, Allied Metals stocks $75,000 worth of Stainless flanges and valves.

. gives pumping station its sea legs

Quality service is emphasized at Allied Metals. Salesmen have engineering training and a metallurgist is available to consult with customers on special problems. Many times they are called in the middle of the night with a rush order. A customer who needs material fast gets it . . . in a matter of hours.

One of Allied Metals' customers, who depend on Stainless Steel and fast service, forms Stainless Steel into vessels, pipes and ducts for processing, storing and transporting petroleum products. Right now they are building a unique submersible pumping station for an off-shore drilling operation. Shallow water near the shore prevents loading deepwater ships at the dry-land storage tanks. A permanent installation would be a navigational hazard in the narrow channel.

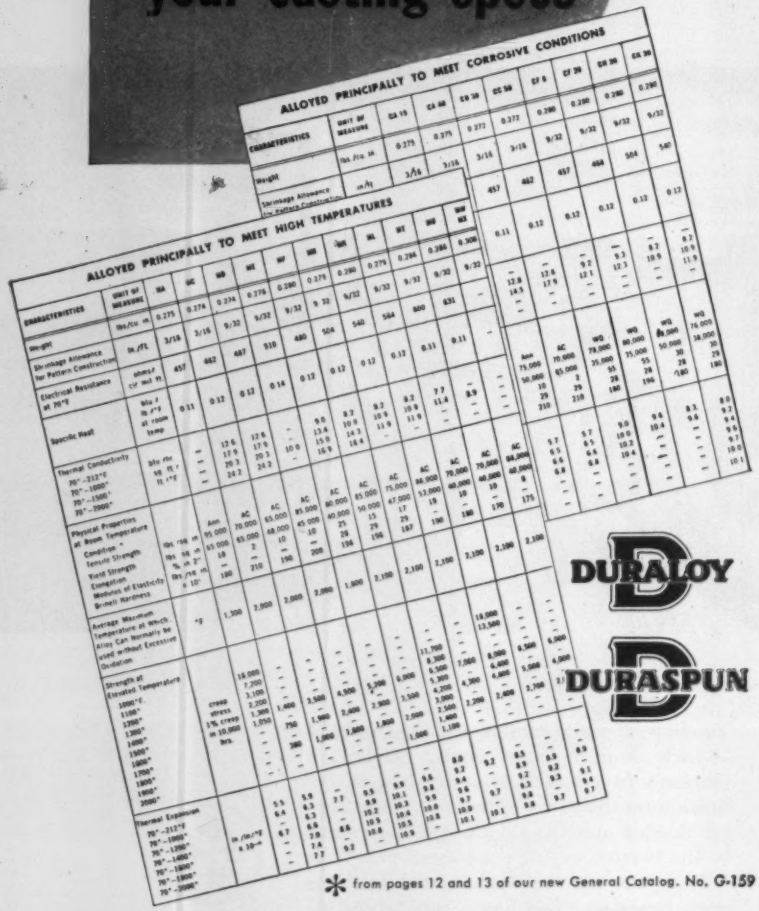
To allow off-shore loading, sea legs, made of 20-inch Stainless Steel piping, support a platform in 110 feet of water—some distance from the shore. When not in use, legs are flooded and the pumping station sinks to the bottom out of the way of shipping.

It pays to use the right material from the start. Stainless Steel has a reputation for costing less because it lasts so long. Its combination of strength, corrosion-resistance and high temperature properties is unmatched. *USS is a registered trademark*

This mark tells you a product is made of modern, dependable Steel.

USS **United States Steel**

TABLES
to help you select the proper alloy for your casting specs



DURALOY

DURASPUN

* from pages 12 and 13 of our new General Catalog. No. G-159

— and there's lots more useful information about high alloy castings in our up-to-date catalog describing Duraloy Service. SEND FOR YOUR COPY.

As one of the pioneers in both static (1922) and centrifugal (1931) high alloy castings, we have a wealth of experience to focus on your high alloy casting problem. Send for our catalog, study it, and then let us help you get the best alloying combination to solve your corrosion, high temperature and/or abrasion problem.

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.

CHICAGO OFFICE: 332 South Michigan Avenue

DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

EXHIBITORS

(*Continued from Page 218*)

press and 6 O.B.I. presses from 14 ton to 125 ton capacities (in operation).

Lake Erie Machinery Corp. 542
Form-All, double apron bending brake.

Landis Machine Co. 432
Five thread rollers; four thread cutting machines; automatic coupling tapping machine; four spindle, semiautomatic threading machine.

Landis Tool Co. 823, 825
New developments in close tolerance, high production cylindrical grinders and methods; 14 cylindrical grinders; automatic crankshaft grinding line; new Microfeed; separate hydraulic unit; special grinding wheel feeds.

Lapointe Machine Tool Co. 1229
1¼ ton, 12 in. SPD broaching machine; HP-30, horizontal broaching machine; 5 ton, 54 in. UVHS broaching machine; 72 in. broach sharpener; 48/48 AUHP, numerically controlled drilling and boring machine.

R. K. LeBlond Machine Tool Co. 810, 908

Lees-Bradner Co. 481
Heavy duty, 12 HD, single spindle, vertical, production hobbing machine; Model 7HD, 8 by 20 in., single spindle, vertical production hobbing machine.

Leland-Gifford Co. 631
Tape controlled hole locator for electronic circuit boards; general purpose, tape controlled hole locator; 8 in. gun drill; 24 in. gun drill; No. 1 multiple spindle drilling machine; No. 2, medium duty drilling machine; high precision, twist drill grinder.

Le Maire Machine Tool Co. 150
Photographic display.

Lodge & Shipley Co. 1046
Twelve machines, including an inexpensive squaring shear; Floturning machine; lathes; brakes and shears; Copymatic tracers.

Logansport Machine Co. Inc. 343

Lucas Div., New Britain Machine Co. 838

MACHINE DESIGN—A Penton publication. 1509

Machinery Magazine, The Industrial Press 1530

Mattison Machine Works 1206

Metalworking Publishing Co. Inc. 1518

Michigan Tool Co. 945
Model 870-A Mark II, Universal shaving machine; Model CGG, 16x18FA automatic crowning gear grinder; Model 999, abrasive hard gear finisher; Model 1537, Roto-Flo, cold rolling machine (threads and splines).

Micromatic Hone Corp. 1225
An exhibit featuring five years of progress.

Minster Machine Co. 1339

Mobil Oil Co., a division of Socony Mobil Oil Co. Inc. 1527

Monarch Machine Tool Co. 701
Model 21-H Mona-Matic production lathe with multicut cycling.

Morris Machine Tool Co. 1445
Radial drills; documentary exhibit of custom production machines.

Morton Mfg. Co. 1050

Motch & Merryweather Machinery Co. 822
(Avey Div.): L-V vertical turner; II-V vertical turner; 0-4, high speed circular saw; No. 2 Aveydraulic, VMA, deep hole drilling machine; No. 250, Turret-Dex, tape controlled turret drill; No. 4, BMA6, rigid base vertical drill; 2-BMA-5 vertical drill; 2-BMA-6 vertical drill with compound table; 24 in., automatic index table; four spindle station vertical drill.

Modern Machine Shop 1535

National Acme Co. 781

National Automatic Tool Co. Inc. 1205
Mechanical and hydraulic honing machines; automatic centering machine; hydraulic press brake; numerically controlled drilling, tapping, milling machine; FB and H-6 lines of multiple spindle, drill-tapping machines; vertical way type machining units; building block units with self-contained power or with separate power unit; building block milling units.

National Broach & Machine Co. 1430
Six Red Wing machines: rotary gear shaver; gear tooth honing machine; pot type broach; GSC-10 gear speeder with broad band electronic amplifier; low cost gear rolling fixtures; rotary gear shaver with rocker type loader; rotary gear shaver for semiautomatic loading; automatic gear gage.

Nebel Machine Tool Corp. 1319
Micro-turn lathe with a 5 hp drive; electronic duplicating attachment.

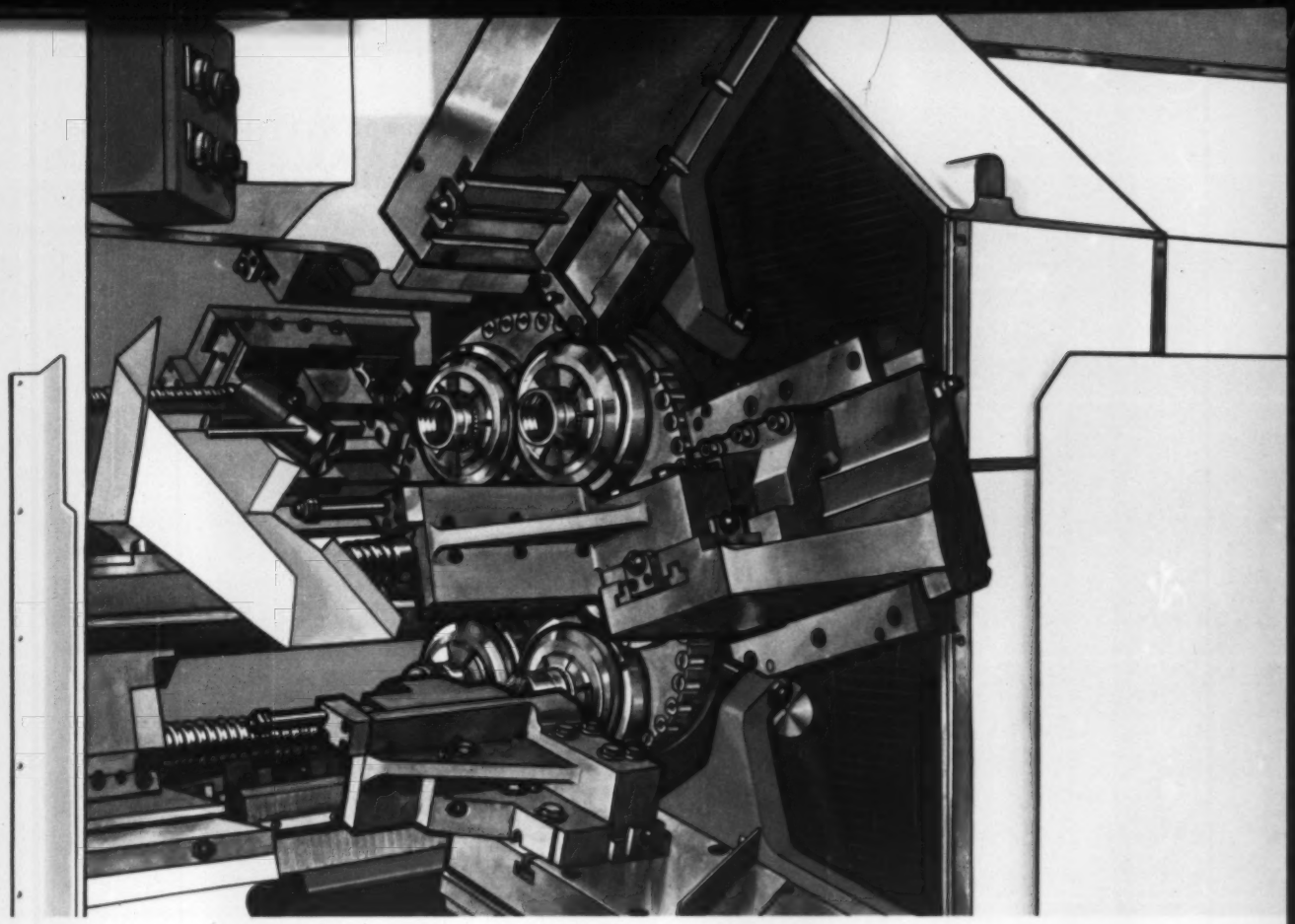
New Britain Machine Co. 838
A widely representative group of New Britain machines, including a Model 52, six spindle bar machine.

NEW EQUIPMENT DIGEST—A Penton publication 1509

Niagara Machine & Tool Works 1330
Presses, press brakes, and shears.

Norton Co. 651
High wheel speed exhibit; conveyorized crankshaft production line, featuring various grinders in operation; centerless grinder; lapping machine; hydraulic surface grinder; automatic plunge grinder; cam grinder; wheel contact accelerator; multiwheel grinder; cutter and tool grinder; various gear hobbers.

Oliver Instrument Co. 342
Model 600 drill pointer; drill pointer with air-



New, large capacity New Britain bar machines

If you feel you know New Britain bar machines like a book, a word of caution: There's a completely new book! New, basic design that removes limitations formerly inherent in bar machine construction. New power, new speed, completely new capability for imaginative tooling.

And new, large bar capacity. That is the important "new" we want to call to your particular attention here. You can apply New Britain standards of productivity to bar stock as large as 5⅛".

The new, big line of four-, six-, and eight-spindle models:

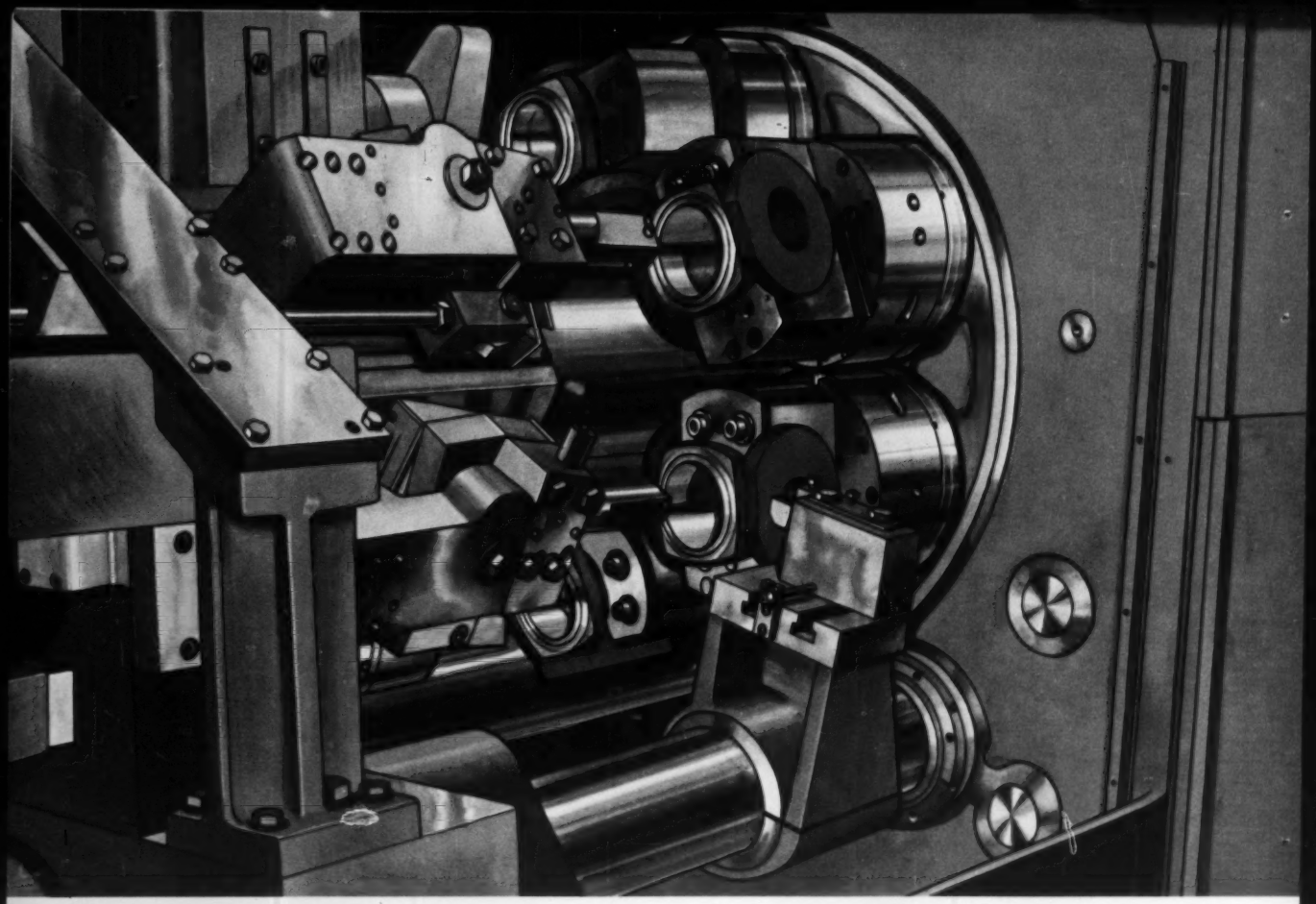
Model 450. Four spindles, 5⅛" maximum capacity, four independently operated radial cross slides.

Model 635. Six spindles, 3½" capacity, with independent radial cross slide in every position.

Model 826. Eight spindles, 2⅝" capacity. Six independently operated cross slides with the two lower slides exceptionally wide to provide elevating blocks for cross slide tooling in the number 3 and 8 positions.

Inexpensive, disc-type cams provide positive actuation of cross slides. Cross slide and end-working tools on all models are easily accessible. All models have positive spindle carrier lifting, locating and locking. New catalog material will give you further details on these machines. Your New Britain representative can show you how the increased profitability built into them can improve your competitive situation. Plan to see him soon.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut



Capacity up to 15″ on New Britain chuckers

We are going to take it for granted that *you* take New Britain chuckers for granted—as the leading make of multiple spindle automatics. Most people do. The big news then is that the profitability of these famous machine tools can now be applied to an increased range of work. The new New Britains are available with chucking capacities up to 15″, which enables you to apply New Britain standards of speed, accuracy and versatility to larger work.

The 15″ capacity applies to four-spindle models. Six-spindle machines will take pieces up to 12″, and eight-spindle chuckers will handle up to 10″.

If you work with large castings and forgings, this might be the announcement of the decade, in terms of an investment that can't fail to be profitable. With equipment like this properly adapted to your particular requirements, nobody, anywhere, is going to trim you on cost per piece.

Call on your New Britain sales engineer for practical, specific information, of course. Meanwhile, we have just published a new catalog on these new large capacity chuckers, and we would be happy to mail your copy to you on request. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Conn.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut

EXHIBITORS

draulic automatic infeed; heavy duty No. 21 drill pointer; No. 21 standard drill pointer; drill point thinner; automatic face mill grinder; tool and cutter grinder; grinder for carbide tipped saws; template tool bit grinder; heavy and bench-type diemaking machine.

Onsrud Machine Works Inc. 749

Parker-Majestic Inc. 1136

Peerless Machine Co. 422
Contour saw; carbon blade bandsaw.

Penton Publishing Co. 1509

Pope Machinery Corp. 482
Model 10-6, double end, horizontal precision boring machine.

Portage Machine Co. 338

Production Magazine, Bramson Publishing Co. 1521

Reed Rolled Thread Die Co. 421

Rivett Lathe & Grinder Inc. 1210
Various lathes, universal and internal-external grinders, collets, thread tool, and accessories.

Rockford Machine Tool Co. 1001
72 in., open side planer with 3 hp milling head; 72 in., hydraulic, open side planer with template duplicator; 18 in. x 8 ft economy lathe; 42 in. x 42 in. x 14 ft, heavy duty, open side shaper-planer with full form duplicator; N-MR-12, roll forming machine; high speed cutoff; 24 in., special hydraulic shaper.

Screw Machine Publishing Co. 1532

Seneca Falls Machine Co. 231
LQ automatic tracer lathe; CS automatic drilling and centering machines; automatic work drivers.

Sheffield Corp. 201
Eighty-five machine tools and inspection instruments, including Crushtrue multiform grinder; Model 181 Crushtrue roll grinder; automatic ID, OD, and radial play gage.

Sibley Machine & Foundry Corp. 341

Snow Mfg. Co. 247
No. DR-3, vertical drilling machine; 2-RM, direct drive, vertical tapping machine; horizontal drilling and tapping machine.

Snyder Corp. 910

Springfield Machine Tool Co. 1110

Standard Electrical Tool Co. 1450

STEEL—a Penton publication. 1509

Sun Oil Co. 1513
Supermarket of petroleum products.

Sundstrand Machine Tool Div., Sundstrand Corp. 1014
Universal, automatic thread milling machine; universal, vertical, knee type milling machine; automatic, multiple tool production lathe; hydraulic, rotary surface grinder; numerically controlled, three axis, vertical spindle machine; multiple spindle, precision boring, drilling, and tapping machine; universal, 50 hp, bed type Rigidmil; three way vertical broach.

Sweet's Catalog Service, a division of F. W. Dodge Corp. 1542

Taft-Peirce Mfg. Co. 1426
Two, Microstoning machine tools; precision surface grinders; 6 in. rotary grinder; semi-automatic lapping machine; manual lapper; back spot facer; attachments for microstoning.

Thompson Grinder Co. 850

Tool Engineer 1514

U. S. Tool Co. Inc. 842
MS-36D, U. S. Duplex, multislide stamping-forming machine; No. MS-28-H, multislide machine for speeds up to 400 strokes per minute.

U. S. Department of Commerce 1126

Van Norman Machine Co., a division of Van Norman Industries Inc. 351
Cylindrical grinder for small grinder; race grinder for ball bearings; milling machines.

Vickers Inc., a division of Sperry Rand Corp. 1542

Walsh Press & Die Div., American Gage & Machine Co. 1120
28 ton, O.B.I. flywheel punch press with variable speed drive; 38 ton, Walsh air clutch, automatic punch press; 65 ton, back geared punch press.

Warner & Swasey Co. 451
No. 2 Microcut, precision chucking lathe; No. 2 Microcut universal turret lathe; single spindle bar automatic; three, single spindle chucking automatics; 1¼ in., six spindle bar automatic; five, ram type turret lathes; two, saddle type turret lathes; two, precision tapping and chucking machines; numerically controlled, servofeed turret lathe; two, saddle type turret lathes, with servotape or convertible; Teleprobomat and Pilot-probomat point-to-point units.

Wiedemann Machine Co. 1249
Seven machines for sheet metal fabrication will feature either tape or templates for hole positioning, including a 15 ton turret punch press, a series of template making and inspecting machines, and a 15 ton tape controlled press.

Hydraulic Div., K. R. Wilson, Inc. 1444

Wilson-Carr, Inc., Production Equipment Magazine 1512

Wysong & Miles Co. 1149

1960 PRODUCTION ENGINEERING SHOW
Navy Pier

A&A Mfg. Co. Inc. 481

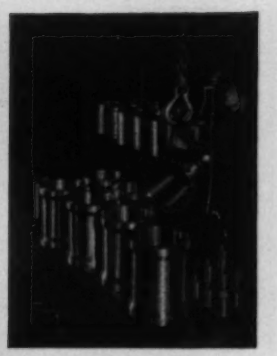
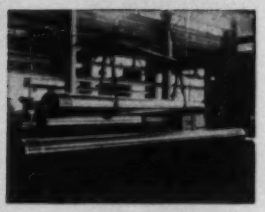
ACF Electronics Div., ACF Industries Inc. 610

Acco Equipment Div., American Chain & Cable Co. 361

Adamas Carbide Corp. 153

Amp Inc. 535

Aero Div., Robertshaw-Fulton Controls Co. 306

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SHENANGO CENTRIFUGAL CASTINGS

Your machine parts, ferrous or non-ferrous, are subject to stress, strain and friction, day after day, year after year . . . so specify Shenango . . . and see what a difference this makes!

Shenango's centrifugal casting process insures longer life because of finer, more uniform, *pressure-dense* grain to begin with . . . free of inclusions, porosity, blowholes and other weakening defects. Then, far less machining is needed and your part is stronger . . . to last and last *and last!*

Shenango's modern and fully-equipped shops will supply you with ferrous or non-ferrous symmetrical parts in virtually any shape or size . . . rough, semi-machined or precision-finished to your most exacting specifications. For full details, write: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

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Ferranti, FI-22, co-ordinate inspection machine; several tape control units.
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Boston Gear Works 123
Breuer Electric Mfg. Co. 423
Bristol Co. 407
Brook Motor Corp. 601
A line of open, dripproof, alternating current motors—1 to 600 hp.
Browning Mfg. Co. 252
Buchanan Electrical Products Corp. 507
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Ajust-tru, aluminum body chucks.
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Chicago Rivet & Machine Co. 236
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Clark, Cutler & McDermott 227
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Tuburr chamfer and facing device; Contourburr; chatterless countersink; Roll-A-Finish; Type-C BurrAway.
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Diehl Mfg. Co. 136
DoAll Co. 116-118
Super saw blades in demonstration; gaging instruments; cutting tools, lubricants; band machining; educational exhibit; angle cutting power saws; surface finishing with hand grinders; high speed friction and contour saws.
Durant Mfg. Co. 302
Panel lighted, high speed, digital indicator.
Eagle Signal Co. 381
Eclipse Machine Div., Bendix Corp. 614
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Electro Dynamic Div., General Dynamics Corp. 606
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O-ring, turret tool postseal and microset adjustable centers; precision lathe turrets and magnetic base holders.
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Engis Equipment Co. 467
Analytical metrology for machines, tools, work; optical, interferometric, photoelectric, and electronic tools; calibration equipment.
Equitable Leasing Corp. 608
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FAC Div., Overseas Commodex Inc. 525
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Fairbanks, Morse & Co. 350
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Transistorized, numerical control system; all-metal sliders, scales, rotors, and stators; a series of computer transformers.
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Field Abrasive Mfg. Co. 500
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Basic Rev-Lok clutches; a dual torque-locking and positioning device; also over-running, indexing, hold-back centrifugal clutches and a backstopping assembly with oil reservoir.
Friden Inc. 334
Furnas Electric Co. 511
Gaertner Scientific Corp. 346
Gast Mfg. Corp. 512
General Automation Corp. 521
General Electric Co. 110
General Radio Co. 630
Stroboscopic tachometer; adjustable autotransformers; variable motor speed controls; assortment of noise measuring instruments.
Gilman Engineering & Mfg. Co. 205
Sixteen station automatic transfer line; a standard, 14 station transfer line; three basic dial-type indexing units for automatic assembly machines; bases, and standard movements.
Graflex Corp. 339
Graham Transmissions Inc. 303
New ratio divider; cutaway transmissions with linear cam control; low cost programing control for machine tool feeds; transmission control devices; motors; spur reducers and worm reducers; coil winder; respirator.
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Hammond Machinery Builders Inc. 432
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Hevi-Duty Electric Co. 368-370
Clean-line, automatic, heat treat furnace (in operation).
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International Business Machines Corp. 428
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Jiffy Disintegrators Inc. 493
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Dial-A-Breaker tooling with adjustable chip breakers; milling dialers with throwaway inserts; some tools with indexable inserts; titanium carbide K165.
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Marathon Electric Mfg. Corp. 249
Marlin-Rockwell Corp. 125
Martin Engineering Co. 371
Marvel Engineering Co. 253
May-Fran Engineering Inc. 455
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Three, high and low temperature shock and vibration insulators.
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L. Newman Tool, Die & Machine Works ..487
Nichols-Morris Corp. 503
A 10 in., Model E, universal dividing head; quick clamp Mil-vises—6 and 8 in.
Norden Div., United Aircraft Corp. 221
Numerical control systems for machine tools, with some units providing for tape punching on the machine; also programed inspection.
North Electric Co. 385
Northwestern Tools Inc. 416
Nylok Corp. 474

(Please turn to Page 230)

Pick the performance you want

use HOCUT 237

... New 100% Chemi-Cool HOCUT

cools... lubricates... prevents rust... stays mint-fresh for life!

QUOTES FROM USERS:

"... Marked reduction in Coolant expense ..."

"... Eliminated a cleaning operation ..."

"... Further savings are experienced because of not having to drain and refill systems periodically ..."

"... Rust protection is far superior than that of soluble oil ..."

"... 100% improvement noted on machining operations ..."

"... Ample lubricity for heavy cuts ..."

"... Work is cold as it comes from the machine ..."

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"... Rancidity and objectionable odors have been eliminated ..."

"... Rust preventive characteristics are excellent. Parts in process are protected overnight and during weekend shut-down ..."

"... Capacity was 28 pieces per day and has been increased to 80 pieces per day ..."

"... Able to increase speeds and feeds to realize the full potential of the lathe"

"... Tool life increased to 2½ times the service formerly obtained ..."

"... Present life of form, box and cut-off tools is four times previous record ..."

Call your Houghton Man or write E. F. Houghton & Co., 303 W. Lehigh Ave., Phila. 33, Pa.

Houghton is supplying Coolants, Rust Preventives and Lubricants to Exhibitors at the Machine Tool Exposition September 6 to 16, 1960.

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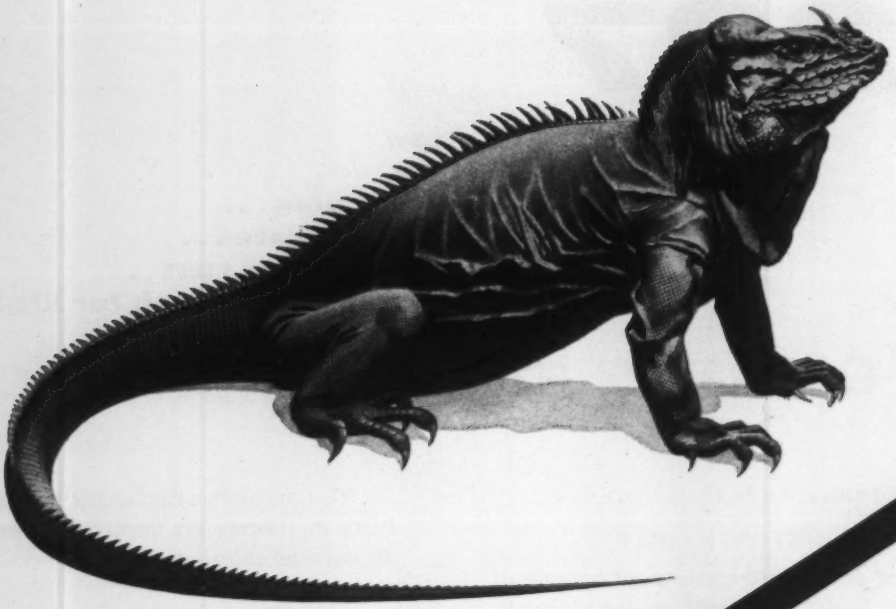
An Iguana will be recognized...
by a *HERPETOLOGIST*

(specialist in reptiles)



potential savings will be recognized... by a *LINCOLN* man

(specialist in arc welding)

ANY IDEA which can cut welding time from 90 to 45 minutes on missile beams for the Army is darned important! That's exactly what happened in a New Jersey plant.

A LINCOLN Field Engineer was walking through the plant with the Welding Foreman and Plant Manager. Naturally he was interested in watching the welding operation on missile beams. A thought crossed his mind. He asked if he could demonstrate LINCOLN Jetweld electrodes on the beams. He rolled up his sleeves; took some Jetweld from the trunk of his car, and cut the welding time from 90 to 45 minutes. The weldors on the job did the same.

That afternoon the Field Engineer finished his plant tour and spotted some applications for Fleetweld 37 electrodes for welding sheet metal on trailer bodies. Again welding time was cut almost in half, cleaning time reduced and overall costs slashed to the bone.

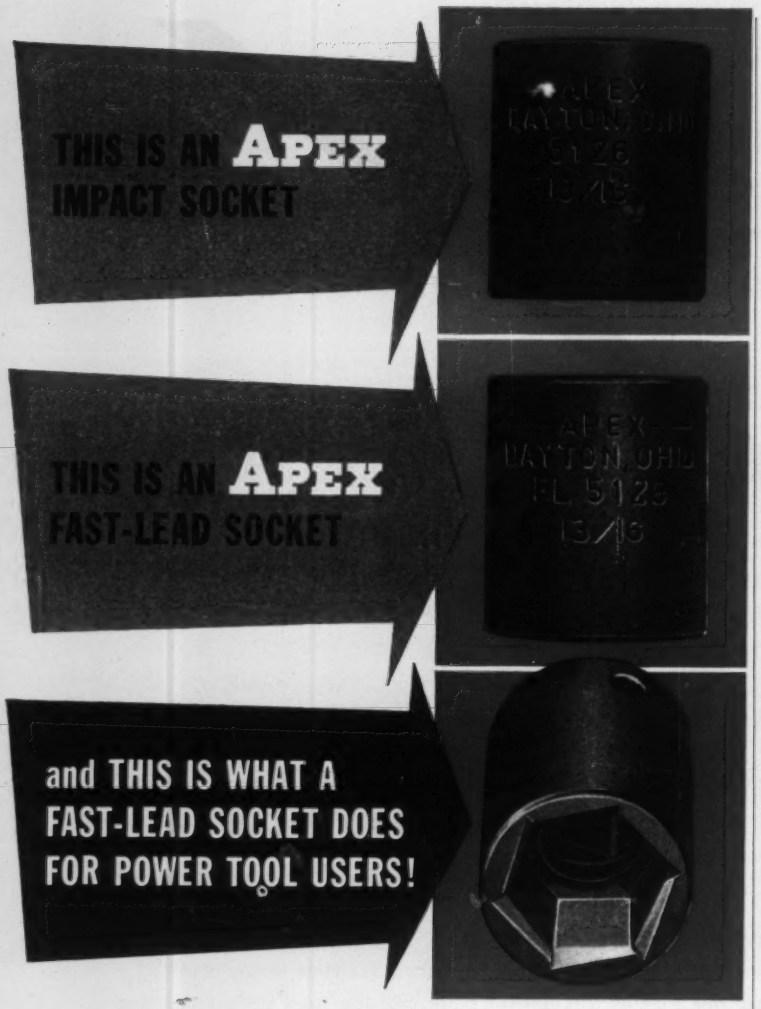
Quite a day's work for one Field Engineer . . . but putting PROFIT into welding operations is part of each LINCOLN man's job. You can count on him to show you . . . not tell you how to cut costs and make more money.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

Call your LINCOLN Field Engineer today.

THE LINCOLN ELECTRIC COMPANY
Dept. 2930 • Cleveland 17, Ohio

LINCOLN WELDERS



The broached opening on an Apex Fast-Lead Socket is designed to lead the socket on to the nut or bolt, engaging completely the instant contact is made.

When you use Apex Fast-Lead Sockets on power tool production operations, you can run down an entire series of nuts or bolts without ever stopping the tool. Because an Apex Fast-Lead Socket "gets on" in one-sixth of a turn, with a single, uninterrupted motion, it isn't necessary to even hesitate just before the socket makes contact. And that goes for multiple power tool units, too.

Apex Fast-Lead Sockets . . . ¼" through ⅝" square drive . . . ⅜" through 1 1/16" broached hex openings . . . short, standard, long and extra long lengths. Catalog 30-A has all the facts—write, on your company letterhead please, for your copy.

APEX FASTENING TOOLS

SCREWDRIVING • NUT RUNNING • SPECIAL

The APEX Machine & Tool Co. • 1032 So. Patterson Blvd. • Dayton 2, Ohio

EXHIBITORS

(Continued from Page 226)

O'Neil-Irwin Mfg. Co. 259-63
An adjustable punch and die for hole punching in sheets—for any power press; a 5 ton, OBI press featuring Di-Acro, precision metalworking equipment; sheet layout machine (Hol-Lokator); Di-Acro, box finger brake No. 24-P; also, benders, notchers, rod parters, punch presses, rollers, spring winders, and shears.
Onsrud Cutter Mfg. Co. 501
Opto-Metric Tools Inc. 412
Osborn Mfg. Co. 375
5630-2M1A, automatic finishing machine; polishing lathe.
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Five machines: Model 5-T bending press; end finishing machines; Model 2 rotary bender.
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Abrasive belt grinding attachment.
PurOlator Products Inc. 405

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J. A. Richards Co. 305
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Ross Operating Valve Co. 220
Sixty units of four way solenoid valves; air operated, conveyor safety valve; device to measure response time; speed control valve.
Rowe Machinery & Mfg. Co. 166
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Operating models of several coolant pumps and pumps for molten metal.

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Skinner Chuck Co. 212-214
Wedge screw chuck; hand indexing power chuck; 12 jaw, pinch type chuck with controlled centering pressure; controlled centering pressure chuck; packaged power chucking assemblies for screw machines; Ductile iron trough vises; and a variety of similar chucks; a multipurpose, three way valve; a two-valve line; other specialized solenoid valves.
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ROLLER BEARING
COMPANY

REPORTS SAVINGS...

7 TO 1 REDUCTION IN... DIAMOND WHEEL COSTS

4 TO 1 REDUCTION IN... GRINDING TIME

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June 3, 1960

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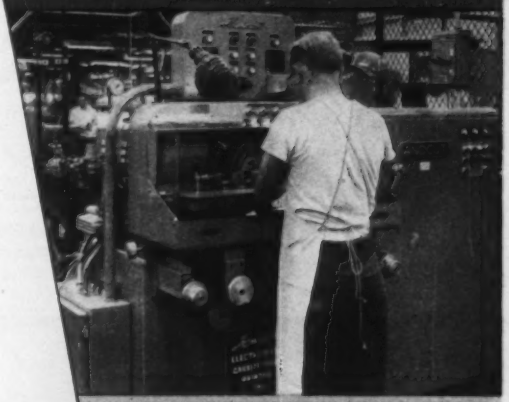
Mechanical Engineering Department



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EXHIBITORS

electrohydraulic servovalves; an economy hydraulic power package; a traverse and feed panel control unit; an adjustable deceleration valve; vane type hydraulic pumps; directional control valves; miniature valves.

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Crane Packing Co. 550
Lapmaster lapping machine.
Decherts 751
Zeh & Hahnemann high production press line, including OBI, straight side, double crank, and arch type—with speeds up to 1000 spm.
Diamond Saw Works 719
DoAll Co. 528
Power cutoff saw with four superblades; superdrill; drilling exhibit; C-70 power saw demonstration; Contour-matic band machine demonstration.
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Sixteen machines, including shapers, planers, grinders (cylindrical, internal, surface), chucking lathe, engine lathe, Gearbur machine, gear planer, milling machine, turret lathe, die sinking machine, radial drill, boring machine.
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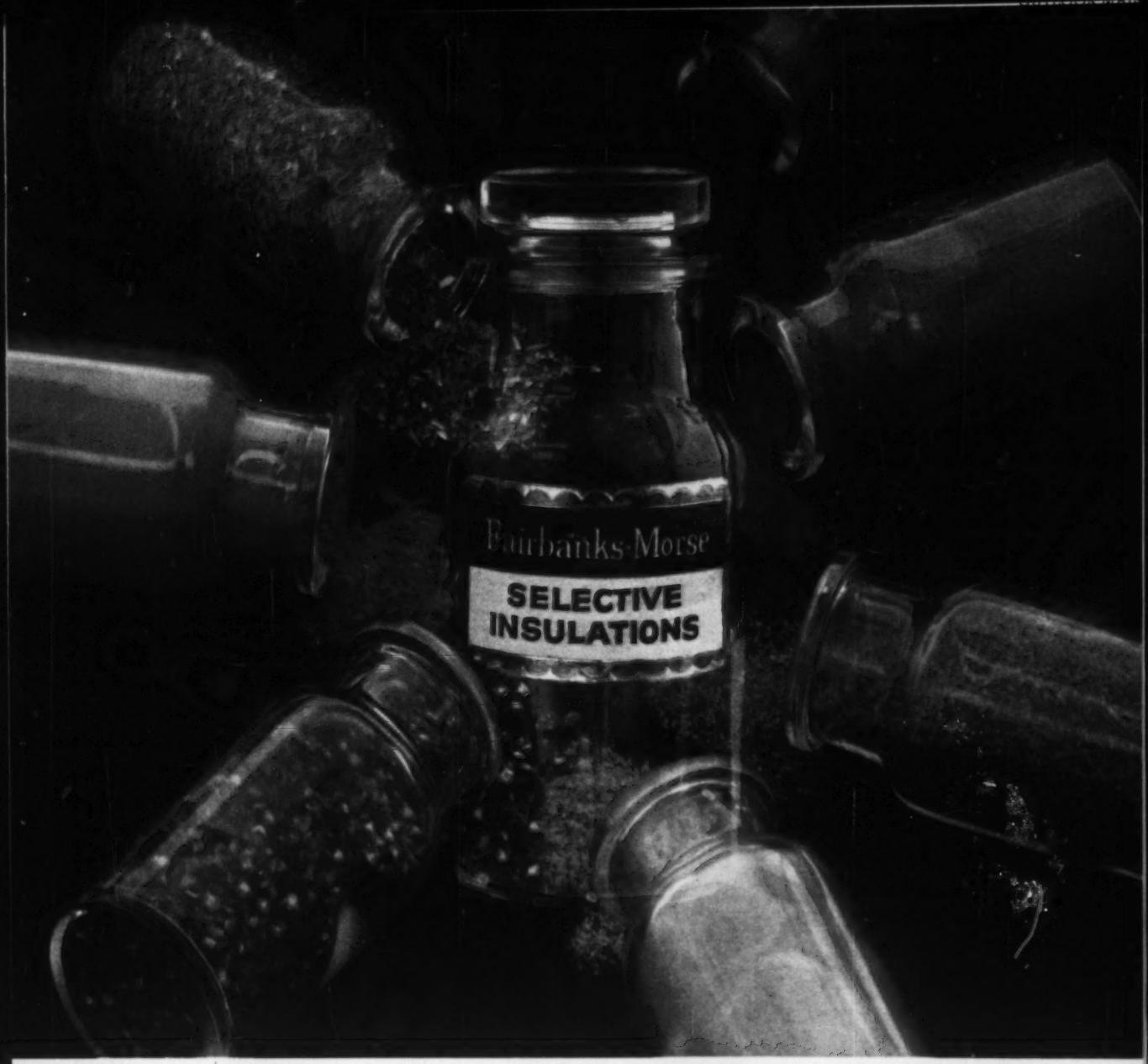

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September Pickup To Be Slight

LOOK for a modest improvement in steel orders, output, and shipments next month. Viewed from the threshold, September looks about like August did 30 days ago.

At the end of July, market analysts predicted that August would bring an upturn. It did, but the gains were less than expected. At many steel companies, new orders advanced only 5 per cent. Nationally, ingot production averaged 54.3 per cent of capacity—topping the July rate by 4 points but falling short of the predicted 57 per cent. Unforeseen labor problems were partly to blame. Last week, for example, steelmaking operations slipped 0.2 of a point to 54.5 per cent as a railroad strike crippled production at the Pittsburgh plants of U. S. Steel Corp. Output was about 1,552,000 ingot tons, bringing the month's total to 6.8 million (vs. 6.3 million in July).

LIQUIDATION CONTINUES— Because August bookings were only slightly better than the previous month's, September shipments won't be much larger than August's. Reason: 1. Automakers have curtailed their initial production schedules for 1961 models. (One of the Big Three will take 25 per cent less steel in September than it originally contemplated.) 2. Other consumers are continuing to chew up more steel than they're ordering—carrying inventory liquidation farther than most marketing men expected. Steelmakers believe most of their customers will complete their inventory adjustments in September, but a few may not stop until late in the fall.

UPTURN IN OCTOBER— Resigned to small gains for the next three or four weeks, steelmen hope to see a vigorous upturn in October. They're counting on seasonal factors, heavy output of new cars, and resumption of buying by users who have cut their inventories as much as they dare.

PICKUP FOR TUBES— Oil country goods, dormant for months because of inventory surpluses and reduced drilling activity, seem to be slowly reviving. Stocks of downriver distributors and major oil producers are still large from an over-all tonnage standpoint, but spot shortages are appearing—especially in the popular sizes.

PIPELINES PUSH PLATES— Approval of a gas transmission line to be built on the West Coast by Pacific Gas & Electric Co. may generate a substantial demand for plates (they're used in the fabrication of line pipe). It's believed that the 36 in. diameter line linking California and Alberta will require about 180,000 tons of plates. Some of the business will undoubtedly go to Canadian mills, but U. S. steelmakers hope to get part of the tonnage. A. O. Smith Corp., Milwaukee, will supply $25 million worth of pipe for a gas transmission line linking Oklahoma, Kansas, and Texas with Chicago. More than 130,000 tons of plates will be required.

MACHINERY SALES LAG— Failure of farm and construction equipment manufacturers to place big orders for steel can be attributed in part to these factors: 1. Farmers are deferring purchases of tractors, combines, and harvesters because they don't know what price support policies the government will adopt after the November elections. 2. Highway programs and logging activity have fallen short of expectations.

FORD BUYS FOREIGN— Ford Motor Co. will buy $1 million worth of parts (rear springs, clutch release bearings, electrical wiring, and steering wheel components) for 100,000 of its 1961 Falcons from British suppliers.

WHERE TO FIND MARKETS & PRICES

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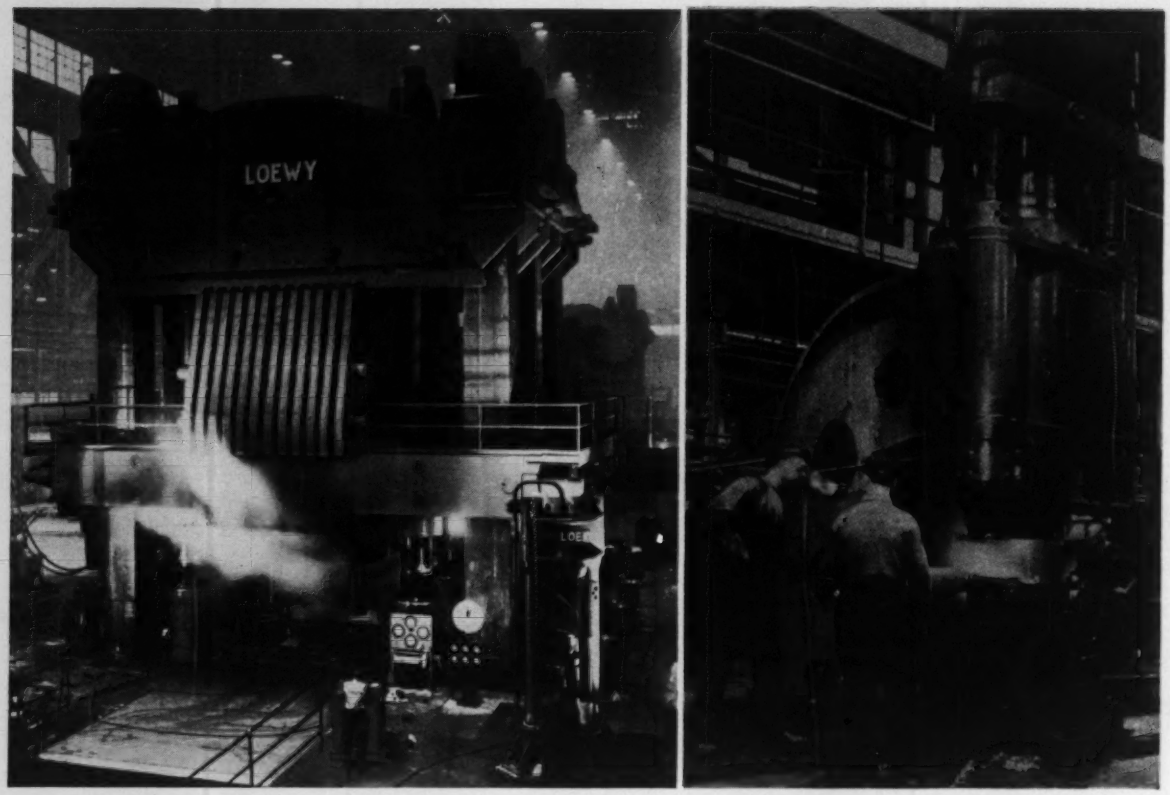
*Current prices were published in the Aug. 22 issue and will appear in subsequent issues.



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Another well-known steelmaker stimulates his sales by means of two brochures which focus on his Loewy press. He testifies that "this fast-acting 2000-ton hydraulic forging press imparts to special steels internal qualities never before achieved."

Similar statements about our equipment are made very frequently. Certainly one of the most remarkable is in a report to the U.S. Air Force which foresees savings of approximately $13,000,000 on a single model of a jet fighter, thanks to the economical production of parts on the famous 50,000-ton Loewy forging press.

B-L-H builds presses for free forging, open die forging, and closed die forging, for hot and cold working of all kinds of metals—ferrous and nonferrous, rare, nuclear and exotic. These machines are available in all capacities from *five hundred to fifty thousand* tons or more. Write Dept. B-8 for further information.

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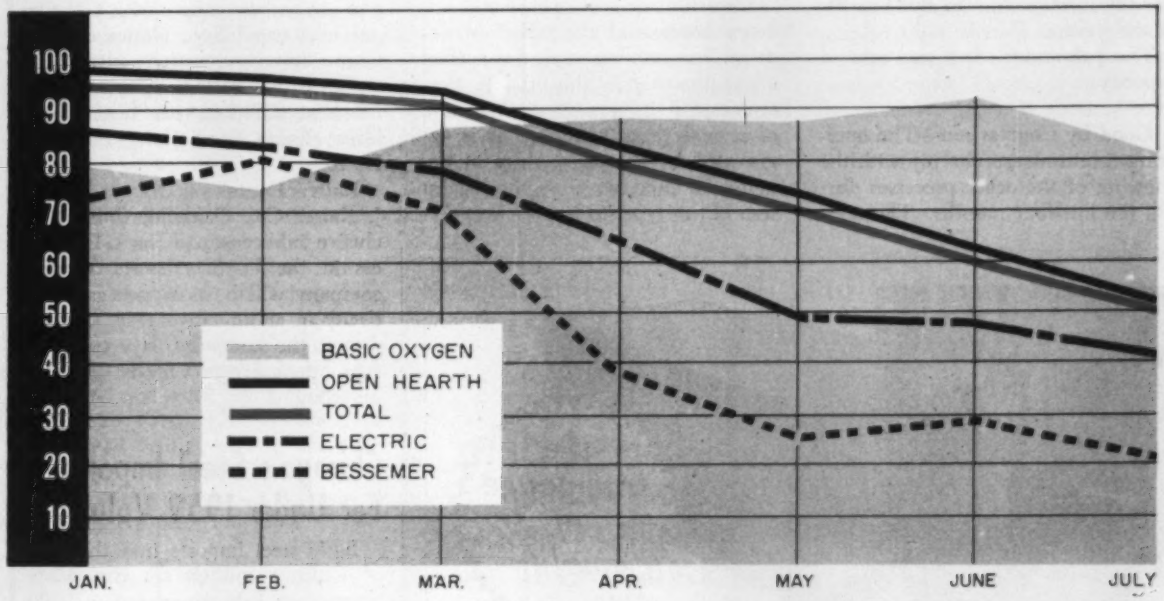
Oxygen Converters: Bright Spot in Dreary Picture

1960 operating rate, percentage of capacities by processes



Source: American Iron & Steel Institute.

Basic Oxygen Leads in Steelmaking

IT PAYS to have basic oxygen capacity if you're in the steelmaking business.

While the national steel operating rate has been going downhill, dipping to as low as 50 per cent of capacity in July, oxygen converters have been running above 80 per cent of capacity in all but one month (February) this year.

• **Reasons**—It is not hard to find reasons for the paradox:

Producers claim the process is significantly more efficient than other methods of making steel.

Because oxygen converters use a high percentage of hot metal, producers prefer to keep them in operation so that they can avoid costly shutdowns at their blast furnaces, coke ovens, and mines.

Oxygen converters are generally used to make the common, low carbon variety of steels that are processed into flat rolled products. It is no problem to switch production from less efficient furnaces to the converters.

They are versatile enough to produce some of the alloys (one steelmaker has even run some stainless through them), which enables producers to fill gaps in the schedules.

"The furnaces are so new that producers still don't know just how much steel they can make in them. Some are undoubtedly running well above reported capacity figures," comments one oxygen steelmaker. The oldest converter (it's at McLouth Steel Corp., Detroit) dates back to 1954.

Only four U. S. producers use the basic oxygen process: Kaiser Steel Corp., McLouth Steel Corp., Jones & Laughlin Steel Corp., and Acme Steel Co. Total annual capacity reported by the American Iron & Steel Institute was 4,157,400 net tons on Jan. 1, 1960—less than 3 per cent of total steelmaking capacity.

• **Getting Better** — Indications are, the high operating rate will continue. Officials at J&L report they are shoving as much production as they can into the more efficient units and will continue to do so the remainder of the year.

Acme Steel says that its converters were shut down for four weeks in July and August, but they are starting them up again and will keep them in operation as long as there are enough orders. (Acme is not transferring any production from its Newport, Ky., works to its Chicago converters because it says the two facilities are not competitive.)

McLouth Steel reports that its oxygen furnaces are operating at 89 per cent of capacity and hopes to increase the rate next month. "It

all depends on how many automobiles Detroit schedules for the fourth quarter," officials told STEEL.

The operating rate of basic oxygen facilities is expected to advance steadily through the last five months of the year.

The July rate: 81.8 per cent of capacity.

• **Good by Comparison**—The operating rate contrasts sharply with the showing of the other processes during the last four months. The open hearth rate is bound to be fairly close to the total national rate because it accounts for the lion's share (about 85 per cent) of the nation's steelmaking capacity.

Electric furnace operations are down because of the falloff in demand for stainless and the special alloys produced by this process. Bessemer steel is in a gradual decline of several years' standing. It is aggravated by the sharp drop in demand for pipe, which is the biggest user of this type steel.

• **More Coming**—The trend toward the basic oxygen process is gaining momentum. By 1962, there will be at least three more producers. Colorado Fuel & Iron Corp. is building two oxygen converters with 100 ton per heat capability. National Steel Corp. has announced plans for building two basic oxygen furnaces rated at 250 tons per heat at its Great Lakes Steel Corp. plant in Detroit.

Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif. (exclusive sublicensor of the L-D process in the U. S.) reports another company will have oxygen steel capacity in another two years. In addition, the company says three or four others are in various stages of planning.

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Chicago's Steel Imports Far Under 1959 Volume

Basic steel imports into the port of Chicago via the St. Lawrence Seaway in July amounted to 9700 net tons, reports the Chicago Association of Commerce & Industry. Comparison: 37,459 tons in July, 1959.

Through July, this year, waterborne steel imports were running about 78,000 tons behind those of last year's comparable period. The figures are 38,026 tons this year and 115,594 tons last year.

Wire rods made up 30 per cent of the basic steel imported by water in July; wire and wire products (including nails and staples) 27 per cent; bars, 10; nuts, bolts, screws, and washers 9; structural steel 9; tubing and piping 7; rails 3; barbed wire 3; and sheets 2.

Forty-five per cent of the items received were from Antwerp, while Rotterdam accounted for 27 per cent, Hamburg 9, Genoa 7, Bremen and LeHavre 4 each, Gothenburg 2, and Liverpool and Naples 1 each.

Tubular Goods . . .

Tubular Goods Prices, Page 251

Prices on galvanized, rigid electrical conduit have been reduced 5 per cent. Elbows, but not couplings, are included. The reduction applies to sizes from ½ in. to 6 in. The new price on ½ in. is 13.38 cents per foot, compared with 14.08 cents previously.

August bookings of oil country

goods were 5 to 10 per cent larger than July's. While over-all stocks are still large, spot shortages are appearing—notably in the popular sizes.

Demand for line pipe looks better. A. O. Smith Corp., Milwaukee, recently booked a $25 million order for 30 and 36 in. diameter pipe which will require more than 130,000 tons of plates. The pipeline for two subsidiaries of Peoples Gas, Light & Coke Co., Chicago, will carry natural gas from Oklahoma, Kansas, and Texas to Chicago.

The large diameter pipe mill of Republic Steel at Gadsden, Ala., is back in operation after being closed down several weeks. Projected changeover from the old plate mill to the newly completed mill has been delayed until September.

Hughes Tool Co. reports 1862 rotary oil drilling rigs in operation in the U. S. and Canada in its latest weekly survey—a decrease of 50 from the preceding week.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 248 & 249

Sheetmakers are marking time until the auto companies give them the go-ahead on shipments for the 1961 model cars. The carmakers are holding back for two reasons: 1. They can't decide how many compacts to build. 2. Their dealers have more than 1 million 1960 models to unload.

Because of the slowness of automotive releases, there's little evidence of an uptrend in orders for steel, though some mills say demand is the best since June. Bookings trail shipments—preventing the accumulation of order backlogs. August orders topped last month's by about 10 per cent, but, unless the auto builders start ordering heavily, and other users begin purchasing as much steel as they're using, September bookings will probably be only 5 per cent better than August's.

Deliveries show little change. Hot rolled sheets can be had within two to three weeks, and, where bands are in stock, cold rolled sheets can be shipped in two to four weeks. Enameling stock is being promised within three to four weeks, stainless flats in four to five weeks.

Demand for galvanized sheets has been holding fairly well, but the fall months are likely to see some tapering off.

Steel Bars . . .

Bar Prices, Page 247

With the vacation season about over, most bar producers look for seasonal improvement in demand. Inventories are thought to have reached the point where consumers will have to increase their buying.

Within a few days, producers hope to have word from the automakers on their plans for initial production of the 1961 model cars. The carbuilders seem undecided about the number of compacts they should make, and their decision will have a big impact on bar sales because the smaller cars use lighter bars and fewer parts.

It's rumored that the automakers may not buy any more steel for October than they'll take in September, but there's some evidence to the contrary. A number of barmakers report their automotive accounts have made it clear October buying will be larger.

Demand from the converters for hot bars remains sluggish. However, better cold finished bar de-

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You asked **TURCO TO MAKE**

HERE'S HOW **PAINTITE** SCORES ON SURVEY'S 12 "MOST WANTED" FEATURES...

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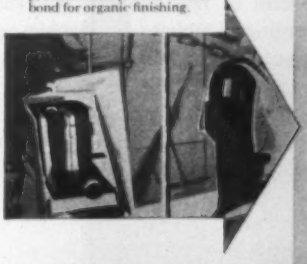
During the first six months of 1959, Turco undertook an extensive survey of the phosphate coating market. Hundreds of users of these coatings were interviewed. Thousands of questions were asked. When the answers were tabulated, Turco began the task of building an iron phosphate process to the *exact specifications* called out in the survey.

The new process is now available. It is called Turco Paintite. Paintite has been thoroughly field-tested in the production lines of a dozen Turco customers. It has passed the most severe tests with flying colors. Turco is proud to announce the addition of Paintite to its ten other Turcoat phosphate and conversion coating processes that provide a better bond for organic finishing.



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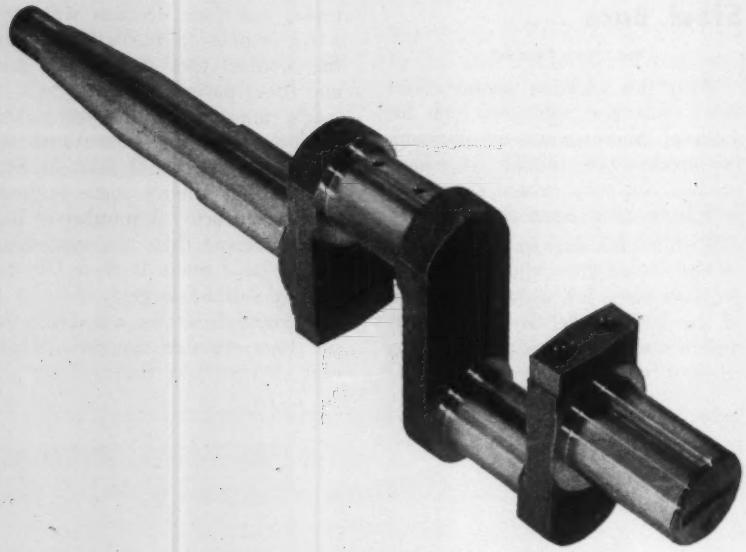

DUCTILE IRON SAVED MONEY

This seventy pound ductile iron crankshaft was made for air compressors manufactured by The Brunner Division of Dunham-Bush, Inc. The increased loads and impact resistance called for by new compressor design specifications required rigidity and strength beyond the limits of the cast iron alloy shafts formerly used. Ductile iron was chosen because the rigidity, yield strength and wear characteristics comfortably exceed operating requirements.

A major cost advantage was realized in this case. Hamilton Foundry used existing pattern equipment made for the gray iron crankshafts in the switch to ductile iron. This saved the cost of new foundry patterns and the greater cost of dies needed for steel forgings. Dunham-Bush achieved a major improvement in product performance for the modest additional cost of the metal in the castings.

When new and unusual design problems arise in the selection of metal and the casting of parts, you will find that the skill and integrity of your foundry is your best insurance that specifications—and delivery schedules—will be met.

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mand is expected within a few weeks and should stimulate the movement of hot bars. Hot bar producers are offering shipments in two to four weeks and a shade longer on alloy bars, depending on processing. Cold finished bars, carbon and alloy, are readily available.

Bounteous Harvest Should Aid Farm Machinery Sales

No improvement in demand for agricultural implements and construction machinery is sighted in the Midwest. However, officials of International Harvester Co. point out that bright prospects for the 1960 growing season should be reflected in sales of harvesting machinery this fall.

Farm tractor sales are lagging, and while there normally is some upturn in September and October retail sales, it is not likely to be great enough to offset the reduction experienced so far. Many farmers are believed to be deferring equipment purchases because of uncertainties about future government farm policies. Farm equipment sales for the year are expected to be moderately lower than they were in 1959.

The Harvester company reports that construction equipment sales to export markets continue to be generally good, but domestic sales have been reduced by lower expenditures for highway programs, slackened activity in logging, and in other applications.

Plates . . .

Plate Prices, Page 247

Demand for plates remains sluggish. August bookings are about on a par with those of the previous month—enough to support mill operations at about 60 per cent of capacity. Sales executives anticipate some gain in orders in September, basing their hopes on more favorable seasonal conditions.

Only in defense work, involving submarine and missile base requirements, is there any real show of improvement. More merchant shipwork is in prospect, including requirements for four freighters for Lykes Bros. Steamship Co. Inc., recently awarded Bethlehem Shipbuilding Div., Bethlehem Steel Co.

The contract for one, nuclear powered submarine has been placed

with Newport News Shipbuilding & Dry Dock Co. It will cost about $32 million. Puget Sound Fabricators Inc., Seattle, have closed a $300,000 contract involving 75 tons of stainless steel plates for a number of process tanks and columns for the Dow Chemical of Canada's plant near Vancouver, B. C.

Wire . . .

Wire Prices, Pages 249 & 250

While some improvement in demand for manufacturers' wire is reported, deliveries on most types are readily available in two to three weeks. At the same time, shipments of merchant wire products can be made from stocks.

Ferroalloys . . .

Ferroalloy Prices, Page 255

New grades and prices for low carbon ferrochrome, ferrochrome-silicon, and exothermic ferrochrome alloys have been announced by Union Carbide Metals Co., a division of Union Carbide Corp., New York. Effective date: Aug. 18.

Prices and specifications for simplex, low carbon ferrochrome (used in stainless steel) are: Simplex ferrochrome 1, chromium 63-66 per cent, silicon 5-7 per cent, carbon 0.010 per cent maximum. Price $0.3450 per pound of chromium; carbon 0.025 per cent maximum, $0.3350 per pound of chromium.

Simplex ferrochrome 2: chromium 68-71 per cent, silicon 2.00 per cent maximum, carbon 0.010 per cent maximum. Price $0.3450 per pound of chromium. Carbon 0.025 per cent maximum, $0.3350 per pound of chromium.

The 0.025 per cent maximum carbon grade of conventional, low carbon ferrochrome has been adjusted this way: 0.025 per cent grade, chromium 68-73 per cent, silicon 0.20-1.00 per cent. Price, $0.3500 per pound of chromium.

Specifications for other grades of conventional, low carbon ferrochrome have been changed to 65 to 71 per cent chromium, and 0.30 to 1.00 per cent silicon. Base prices per pound of contained chromium have been changed: Grade 0.05 per cent maximum carbon, $0.3400; 0.10 per cent maximum carbon, $0.3375; 0.20 per cent maximum carbon, $0.3350; 0.50 per cent maximum carbon, $0.3325; 1.00 per cent maxi-

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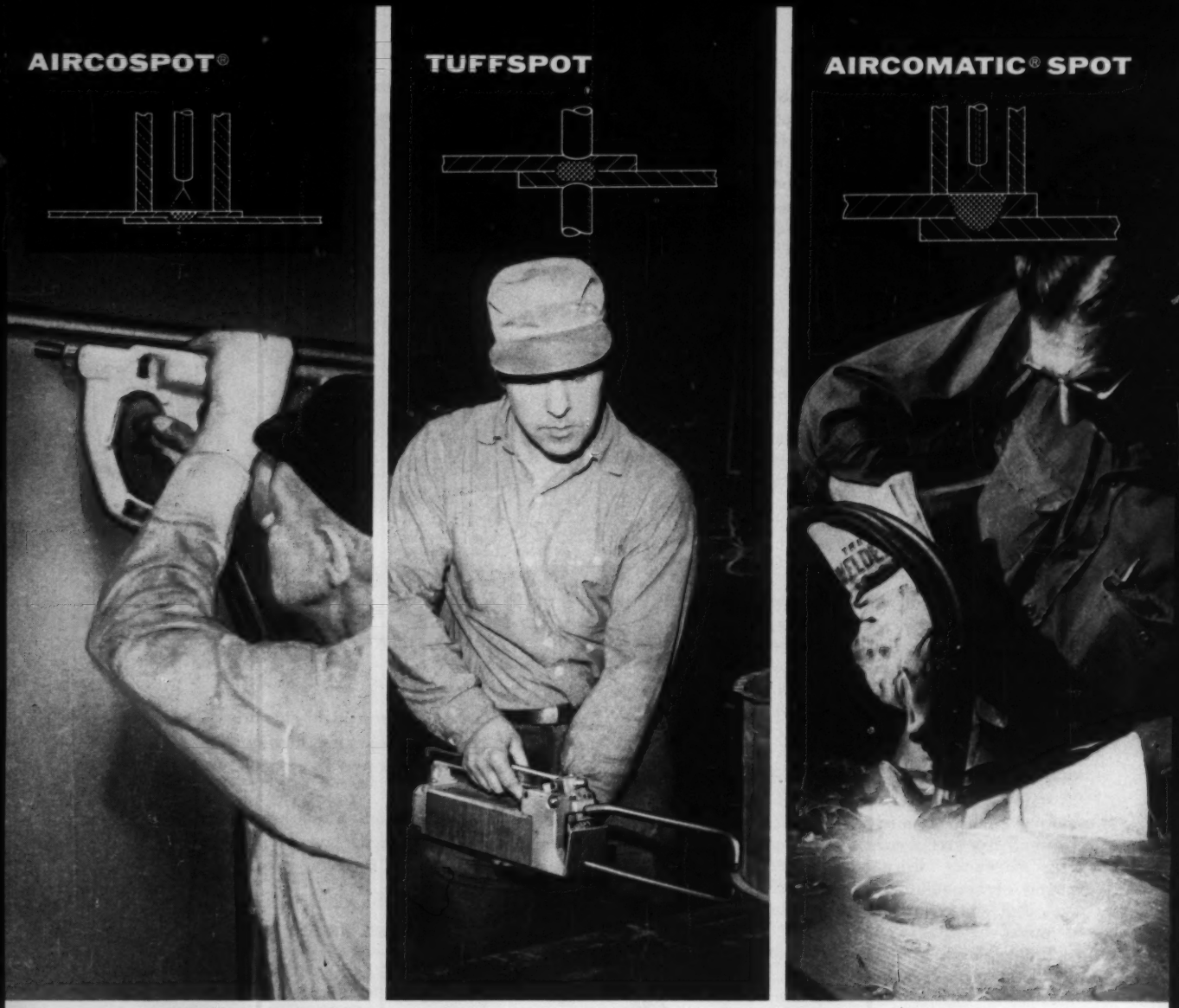

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mum carbon, $0.3300; 1.50 per cent maximum carbon, $0.3275; 2.00 per cent maximum carbon, $0.3250.

New grades, prices, and specifications for ferrochrome-silicon have been posted. They are:

Ferrochrome-silicon, 34-46
Chromium 33-36 per cent
Silicon 45-48 per cent
Carbon 0.05 per cent max
Price: $0.2450 per lb chromium and $0.1460 per lb silicon

Ferrochrome-silicon 40-43
Chromium 39-41 per cent
Silicon 42-45 per cent
Carbon 0.05 per cent max
Price: $0.2450 per lb chromium and $0.1460 per lb silicon

Ferrochrome-silicon 53-24
Chromium 52-57 per cent
Silicon 23-27 per cent
Carbon 0.05 per cent max
Price: $0 3050 per lb chromium and $0.1460 per lb silicon

Ferrochrome-silicon 57-15
Chromium 55-59 per cent
Silicon 13-17 per cent
Carbon 0.05 per cent max
Price: $0.3200 per lb chromium and $0.1460 per lb silicon

Ferrochrome-silicon 60-10
Chromium 58-62 per cent
Silicon 8-12 per cent
Carbon 0 05 per cent max
Price: $0 3250 per lb chromium and $0.1460 per lb silicon

The price of ferrosilicon-chrome has been increased to $0.3450 per pound of chromium. This alloy contains 50-54 per cent chromium, 28-32 per cent silicon, and 1.25 per cent (maximum) carbon.

The division also announced new prices for exothermic ferrochrome alloys as follows: Chromtemp 4, $0.3000 per pound of chromium; Chromtemp 6, $0.2900; Chromtemp 20-6, $0.3300; Chromtemp 25-6, $0.3100; Chromsiltemp, $0.4200.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 248

Seasonal demand for reinforcing bars is reflected in heavily loaded order books at some producing mills. The strong demand is expected to hold through the next couple of months. Production of mesh is down, however, because of the sluggishness in highway construction at some points.

Structural Shapes . . .

Structural Shape Prices, Page 247

Following a brief flurry, structural market activity is coasting again. New inquiries have tapered off, and orders are spotty. Competition among fabricators is sharp. In the East, shops not set up to do bridgework find the market particularly lean. Bridge volume is heavier in New England. More building is being estimated in that area; proposed Boston structures alone cost $70 million.

Fabricators' bookings are a little heavier than they were at this time last year, but the shops are meeting increasing competition from prestressed and reinforced concrete.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

8500 tons, bridge superstructure. Monongahela River, West Brownsville and Brownsville, Pa., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

5500 tons, Chesapeake Bay bridge (Virginia) and tunnel project, Little Creek-Kiptopeake, Va., to American Bridge Div., U. S. Steel Corp., Roanoke, Va., through Chesapeake Bay Ferry District Commission.

2058 tons, Illinois Central Railroad overpass at 100th Street over South Expressway, Chicago, for Cook County, Ill., to Mount Vernon Bridge Co., Mt. Vernon, Ohio.

708 tons, state bridgework, LR 1011 (3), Berks County, Pennsylvania, through James B. Morrissey, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

505 tons, including 110 tons of joists, distribution center and office, Avon Products, Newark, Del., through Frederick G. Crapt to Pilgrim Steel Co., Camden, N. J.

470 tons, high school, Weston, Mass., to Haarmann Steel Co., Holyoke, Mass.; 45 tons of concrete reinforcing bars to Scherer Steel Co., East Hartford; Daniel O'Connell's Sons Inc., Holyoke, general contractor.

400 tons, Oregon State twin spans, Clackamas River, to Gunderson Bros. Engineering Corp., Portland, Oreg.; general contract to C. M. Corkum Co., Inc., Portland, low at $460,327.

357 tons, Marywood College, Scranton, Pa., through F. G. Mastriani Co., general contractor, to Anthracite Bridge Co., Scranton.

325 tons, senior-junior high school, Coventry, Conn., to City Iron Works, New Haven, Conn., (structurals), and Scherer Steel Co., East Hartford, Conn. (concrete bars); Wadhams & May Co., Hartford, Conn., general contractor.

300 tons (estimated), building, Southern New England Telephone Co., West Hartford, Conn., to Topper & Griggs (Bethlehem Fabricators Inc.), Hartford, Conn.; Felix Buzzi & Son Inc., Torrington, Conn., general contractor.

300 tons or more, 22 story Hilton Hotel, Portland, Oreg., reported to Lewis-Riffel Co., Portland; general contractor, Andersen-Westfall Co. Inc., Portland, at $6,026,084.

205 tons, physical research laboratory for the Du Pont interests, Henry Clay, Del., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

4141 tons, weldable quality structural steel, superstructure, Washington Channel bridge; bids Aug. 30, Department of Highways & Traffic, District of Columbia.

4060 tons, superstructure for Washington State Vantage Bridge, Columbia River, bids to Olympia, Wash., Aug. 30.

1064 tons, state bridgework, Middlesex County, New Jersey, bids Sept. 8; also required, 720 tons of reinforcing steel.

900 tons, powerhouse, etc., Tacoma's Mayfield power project; bids in.

750 tons, Southwest Freeway, Inner Loop structure, Washington; bids Sept. 7, Department of Highways & Traffic, District of Columbia.

685 tons, steel transmission towers, Cooper Lake (Alaska) project; bids soon to Chugach Electric Association Inc., Anchorage, Alaska; North Pacific Consultants, Portland, Oreg., engineer.

400 tons, standby powerhouse, Hanford Works, Puget Sound Bridge & Dredging Co., Seattle, low at $407,500 to Kaiser Engineers.

400 tons, plant for West Coast Telephone Co., Everett, Wash.; Anderson Construction Co.,

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Tacoma, Wash., low base bid at $1,143,280.
360 tons, race track, Brandywine, Del., postponed indefinitely.

REINFORCING BARS . . .

REINFORCING BARS PLACED

630 tons, dormitory, University of Tennessee, Knoxville, Tenn., to Wilson-Weesner-Wilkinson Co., Knoxville; V. L. Nicholson Co., Knoxville, general contractor.
350 tons, Science Building, Washington University, Pullman, Wash., to Joseph T. Ryerson & Son Inc., Spokane, Wash.; general contract to Henry George & Son, Spokane, Wash., and Dunham Bros., Moscow, Idaho, joint low at $804,920.
287 tons, Science Building, Seattle University, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Wick Construction Co., general contractor, low at $920,400.
235 tons, two road spans, Washington State, Pierce County, to Northwest Steel Rolling Mills Inc., Seattle; John P. Hopkins, Mercer Island, general contractor, low at $2,360,729.
235 tons, two state highway bridges, Naugatuck, Conn., to U. S. Steel Supply Div., U. S. Steel Corp., Hartford, Conn.; Brunalli Construction Co., Southington, Conn., general contractor; 510 tons, steel piles, to U. S. Steel Corp., Hartford; 665 tons, fabricated structural steel to American Bridge Div., U. S. Steel Corp., Pittsburgh.

REINFORCING BARS PENDING

1050 tons, Social Security Bldg., Baltimore, Piracci Construction Co., Baltimore, low on the general contract.
725 tons, Vantage Bridge, Washington State, Columbia River; bids to Olympia, Wash., Aug. 30.
720 tons, state bridgework, Middlesex County, New Jersey, bids Sept. 8; also required, 1064 tons of structurals.
500 tons, 22 story Hilton Hotel, Portland, Oreg.; general contract placed.
500 tons, addition to Washington State Hospital, Sedro-Woolley; general contract to Nelson Construction Co., Ferndale, Wash., low at $1,194,500.
258 tons, Washington State, Cowlitz County bridge; bids to Olympia, Sept. 7.
225 tons, Idaho state road structures, Bonner and Bingham Counties; low bid in $1,024,077.

PLATES . . .

PLATES PLACED

184 tons, snowplow steel, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Washington State; general contract to Hall Machinery Co., Seattle.
152 tons, high tensile, grade Hy-20, naval shipyard, Portsmouth, N. H., to Lukens Steel Co., Coatesville, Pa.
115 tons, General Stores Supply Office, Navy, Philadelphia, to U. S. Steel Corp., Pittsburgh; also 200 tons of sheets to the same supplier; 247 tons of steel strapping to Acme Steel Co., Chicago.

PLATES PENDING

450 tons, 1 million gallon steel reservoir, Loch Sheldrake Water District, Fallsburgh, N. Y.; bids Sept. 8 to the town board, South Fallsburg.
112 tons, 48 in. municipal pipeline, Philadelphia; bids close Aug. 30.
100 tons, two, 109 ft harbor tugs, Navy Purchasing Office, Washington; bids Oct. 3.
100 tons or more, 1 million gallon, ground water level, water reservoir; alternative bids for prestressed concrete; bids to Olympia, Wash., Aug. 30.

RAILS, CARS . . .

RAILROAD CARS PLACED

Fruit Growers Express, 211, forty ft, 50 ton refrigerator cars, and 60, fifty ft, 70 ton refrigerator cars to its shops at Alexandria, Va.
Rail-Trailer, 100, eighty five ft piggyback flatcars to Bethlehem Steel Co.'s Johnstown, Pa. plant.

Iron Ore Statistics—June, 1960

Stocks of Iron Ore at Furnaces and Docks—June, 1960
(Gross tons)

	U. S. Ores		Canadian		Foreign	
At U. S. Furnaces	L. Sup.	Other	L. Sup.	Other	Ores	—Total—
Start of month	17,948,456	3,751,834	666,362	2,898,846	13,597,935	38,863,433
End of Month:						
Mass., N. Y.	2,163,885	58,059	37,305	146,780	324,673	2,730,702
Pennsylvania	5,646,387	379,269	28,703	136,370	5,974,022	12,164,751
Md., Va., W. Va.	156,762	9,189	.....	1,307,669	2,584,602	4,058,222
Ky., Tenn., Tex.	315,664	257,882	.....	284,876	93,692	952,114
Alabama	872	1,895,206	.....	129,203	3,340,098	5,365,384
Ohio	6,390,110	44,586	400,841	1,416,079	1,064,652	9,316,268
Indiana	4,895,194	4,851	361,343	.....	70,644	5,332,032
Illinois	2,874,831	35,583	42,638	.....	245,253	3,198,305
Mich., Minn.	2,365,589	.....	137,105	107,737	232,660	2,843,091
Colo., Utah, Calif.	.....	1,104,967	.....	.....	27,176	1,132,143
Undistributed	324	2,696	.....	.....	501	3,521
End of Month	24,809,618	3,792,288	1,007,935	3,528,719	13,957,973	47,096,533
At U. S. Docks	1,895,283	.....	75,497	901,020	1,798,374	4,670,174
Total U. S. Stocks	26,704,901	3,792,288	1,083,432	4,429,739	15,756,347	51,766,707
At Canada Furnaces:						
Start of Month	1,218,030	.....	124,432	253,640	17,118	1,613,220
End of Month	1,585,697	.....	103,923	255,618	23,426	1,968,664
Total U. S.-Canada	28,290,598	3,792,288	1,187,355	4,685,357	15,779,773	53,735,371

Consumption of Iron Ore in U. S. and Canada—June, 1960
(Gross tons)

	U. S. Ores		Canadian		Foreign	
In U. S.: Furnaces	L. Sup.	Other	L. Sup.	Other	Ores	—Total—
Mass., New York	341,834	35,817	21,203	30,266	28,551	457,671
Pennsylvania	691,574	174,859	266	42,215	852,126	1,761,040
Md., Va., W. Va.	122,127	27,472	.....	328,006	349,974	827,579
Ky., Tenn., Tex.	50,846	75,613	.....	42,108	56,187	224,754
Alabama	.....	355,446	.....	.....	164,403	519,849
Ohio	952,813	27,154	55,014	160,090	124,803	1,319,874
Indiana	1,009,251	646	108,399	.....	30,784	1,149,080
Illinois	550,583	13,795	6,432	.....	45,507	616,317
Mich., Minn.	584,900	.....	35,974	21,929	56,261	699,064
Colo., Utah, Calif.	.....	473,906	.....	.....	10,058	483,964
Undistributed	118	231	.....	.....	.....	349
In U. S.						
Blast furnaces	2,740,873	737,777	126,006	299,662	517,223	4,421,541
Steel furnaces	92,060	50,561	4,422	8,315	435,539	590,897
Sintering	1,471,045	387,974	96,860	316,637	765,877	3,038,393
Miscellaneous	68	8,627	.....	.....	15	8,710
Total U. S.	4,304,046	1,184,939	227,288	624,614	1,718,654	8,059,541
In Canada:						
Blast furnaces	219,258	.....	59,320	85,336	.....	363,914
Steel furnaces	3,286	.....	.....	13,729	7,855	24,870
Sintering	61,026	.....	18,923	23,086	.....	103,035
Miscellaneous	.....	.....	.....	.....	.....	.....
Total Canada	283,570	.....	78,243	122,151	7,855	491,819
Total U. S. & Canada	4,587,616	1,184,939	305,531	746,765	1,726,509	8,551,360

Data from American Iron Ore Association.

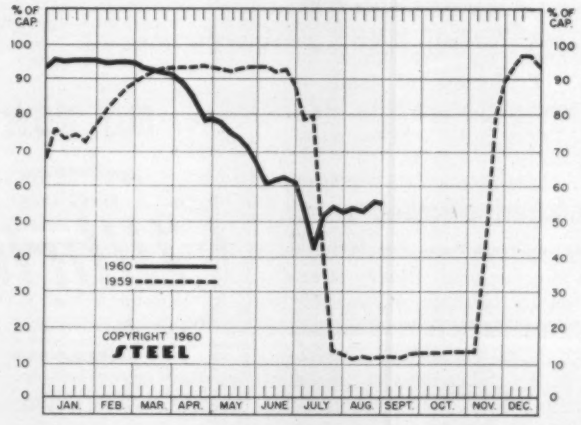
DISTRICT INGOT RATES

(Percentage of capacity utilized)

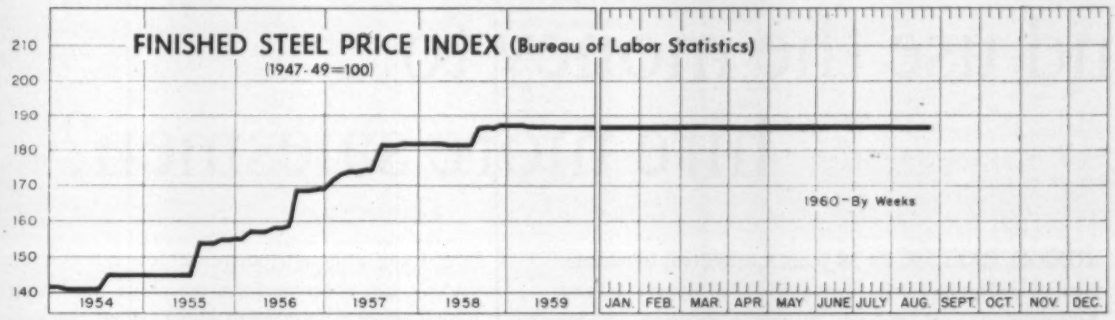
	Week Ended Aug. 28	Week Ago	Month Ago	Year Ago
Northeastern	59	62	61	*
Buffalo	57	59	56	*
Pittsburgh	46	47	49	*
Youngstown	44	45	48	*
Cleveland	50	51	32	*
Detroit	79	77	80	*
Chicago	59	58	56	*
Cincinnati	58	55	48	*
St. Louis	66	68	41	*
Southern	60	59	62	*
Western	53	49	51	*
Total Industry	54.5	54.7	53.3	11.7
Index (1947-49=100)	96.6	97.0	84.6	20.7
Net Tons (In thousands)	1,552	1,558	1,520	332

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Aug. 23, 1960	Week Ago	Month Ago	July Index	Year Ago
186.2	186.2	186.2	186.2	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.489
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	195.395
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.414
		Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED STEEL PRICE INDEX

	Aug. 24 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	207.63
Index in cents per lb	6.713	6.713	6.713	6.713	5.625

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$127.41
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	32.67	32.33	31.83	38.33	44.33

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 24 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.50
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.317
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35-6.45
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-9/16" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton	Aug. 24 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	58.16
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	59.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

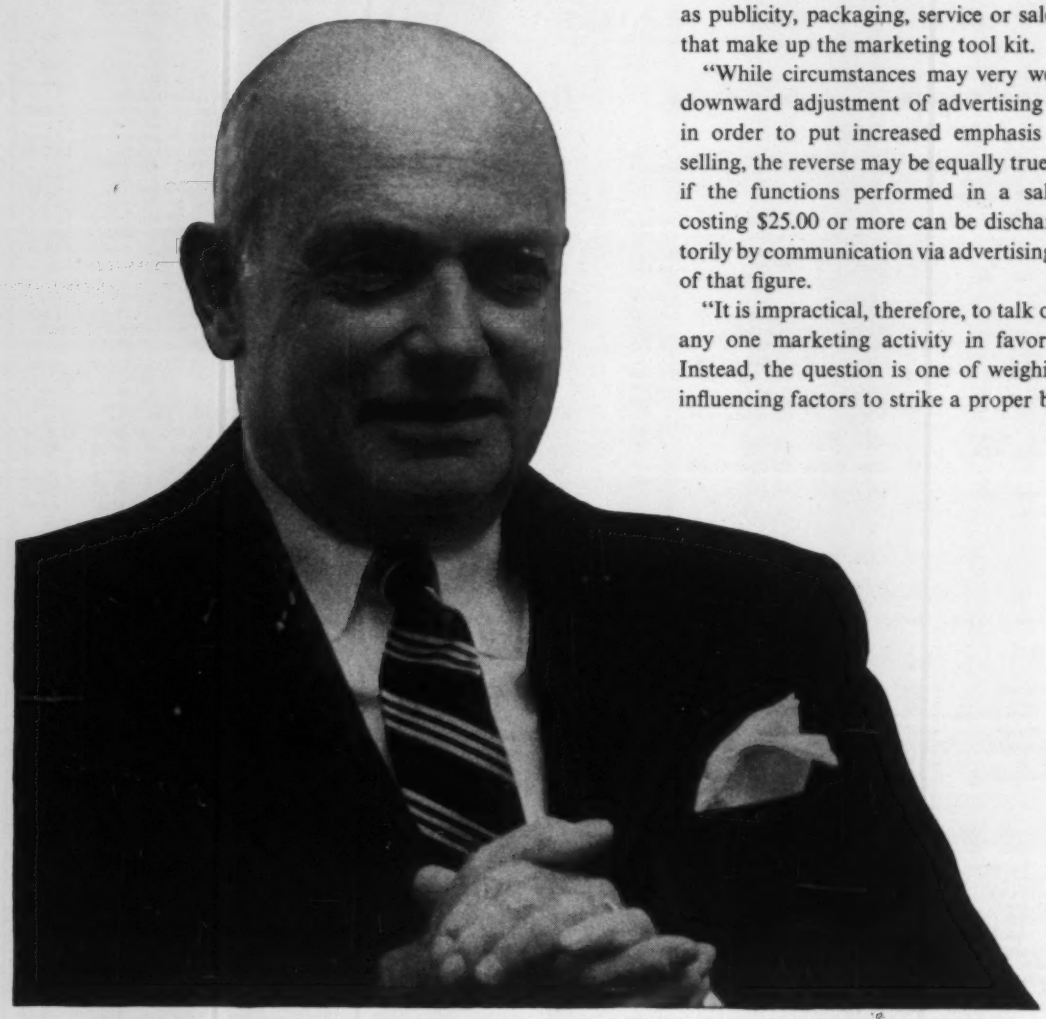
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$31.50	$30.50	$30.50	$38.50	$44.50
No. 1 Heavy Melt, E. Pa.	35.00	35.00	34.00	40.00	46.50
No. 1 Heavy Melt, Chicago	31.50	31.50	31.00	38.50	42.00
No. 1 Heavy Melt, Valley	33.50	33.50	33.50	41.50	46.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	31.50	38.50	44.00
No. 1 Heavy Melt, Buffalo	29.50	29.50	29.50	33.50	39.50
Rails, Rerolling, Chicago	53.50	53.50	51.50	61.50	64.50
No. 1 Cast, Chicago	42.50	42.50	40.50	53.50	46.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.625
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	26.25

"Why not cut out advertising and use the money to hire more salesmen?"

ROBERT HELLER, for 30 years a consultant to management of leading industrial firms and head of Robert Heller & Associates, Inc., Cleveland, answers a question that has crossed the minds of countless business executives.



"Advertising, although indispensable in our modern economy, can never perform the entire marketing job by itself. But neither can direct selling, nor any other single one of such sales-producing influences as publicity, packaging, service or sales promotion that make up the marketing tool kit.

"While circumstances may very well indicate a downward adjustment of advertising expenditures in order to put increased emphasis on personal selling, the reverse may be equally true. Particularly if the functions performed in a salesman's call costing $25.00 or more can be discharged satisfactorily by communication via advertising at a fraction of that figure.

"It is impractical, therefore, to talk of eliminating any one marketing activity in favor of another. Instead, the question is one of weighing all of the influencing factors to strike a proper balance."

AIA

ASSOCIATION OF INDUSTRIAL ADVERTISERS

271 madison avenue • new york 16, n. y. • telephone murray hill 5-8921

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PHOENIX, PITTSBURGH, PORTLAND, ROCHESTER, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., TULSA, YOUNGSTOWN.

Steel Prices

Mill prices as reported to STEEL, Aug. 24, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 248; footnotes, page 250.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)

Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 .....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 .....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 .....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14..122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 .....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ir 1. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES

Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron

Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 .6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ....5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.925
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1....5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 .....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 .....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 .....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra)

Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 .....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.85
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 .....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025

Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 .5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky A10 .....7.525
Cleveland J5, R2 ....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ...6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 ....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinaFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinaFerry,O. W10..6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1)..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 ....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 .....8.70
Mansfield,O. B6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forging Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Wire Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	5.10
Allenport, Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland, Ky. (8) A10	5.10
Atlanta A11	5.10
Bessemer, Ala. T2	5.10
Birmingham C15	5.10
Conshohocken, Pa. A3	5.15
Detroit M1	5.10
Ecorse, Mich. G5	5.10
Fairfield, Ala. T2	5.10
Farrell, Pa. S3	5.10
Fontana, Calif. K1	5.825
Gary, Ind. U5	5.10
Ind. Harbor, Ind. I-2, Y1	5.10
Johnstown, Pa. (25) B2	5.10
Lackaw'na, N.Y. (25) B2	5.10
Los Angeles (25) B3	5.85
Los Angeles C1	8.60
Minnequa, Colo. C10	6.20
Riverdale, Ill. A1	5.10
San Francisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon, Pa. S3	5.10
S. Chicago, Ill. W14	5.10
S. San Francisco (25) B3	5.85
Sparrows Point, Md. B2	5.10
Torrance, Calif. C11	5.85
Warren, O. R2	5.10
Weirton, W. Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18	8.40
Farrell, Pa. S3	8.40
Gary, Ind. U5	8.40
Houston S5	8.65
Ind. Harbor, Ind. Y1	8.40
Kansas City, Mo. S5	8.65
Los Angeles B3	9.60
Lowellville, O. S3	8.40
Newport, Ky. A2	8.40
Sharon, Pa. A2, S3	8.40
S. Chicago, Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10	7.575
Bessemer, Ala. T2	7.575
Conshohocken, Pa. A3	7.575
Ecorse, Mich. G5	7.575
Fairfield, Ala. T2	7.575
Farrell, Pa. S3	7.575
Gary, Ind. U5	7.575
Ind. Harbor, Ind. I-2, Y1	7.575
Lackawanna, N.Y. B2	7.575
Los Angeles (25) B3	8.325
Seattle (25) B3	8.575
Sharon, Pa. S3	7.575
S. Chicago, Ill. W14	7.575
S. San Francisco (25) B3	8.325
Sparrows Point, Md. B2	7.575
Warren, O. R2	7.575
Weirton, W. Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	5.35
Warren, O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn, Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover, O. G6	7.425
Evanston, Ill. M22	7.525
Farrell, Pa. S3	7.425
Follansbee, W. Va. W10	7.425
Fontana, Calif. K1	9.20
Franklin Park, Ill. T6	7.525
Ind. Harbor, Ind. Y1	7.425
Indianapolis S41	7.575
Los Angeles C1, S41	9.30
McKeesport, Pa. E10	7.525
New Bedford, Mass. R10	7.875
New Britain, Conn. S15	7.875
New Castle, Pa. B4, M22	7.425
New Haven, Conn. D2	7.875
New Kensington, Pa. A6	7.425
Pawtucket, R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale, Ill. A1	7.525
Rome, N.Y. (32) R6	7.425
Sharon, Pa. S3	7.425
Trenton, N.J. (31) R5	8.875
Warren, O. R2, T5	7.425
Worcester, Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie, Pa. S18	15.55
Dover, O. G6	15.55
Farrell, Pa. S3	15.55
Franklin Park, Ill. T6	15.55
Harrison, N.J. S18	15.55
Indianapolis S41	15.70
Los Angeles S41	17.75
Lowellville, O. S3	15.55
Pawtucket, R.I. N8	15.90
Riverdale, Ill. A1	15.55
Sharon, Pa. S3	15.55
Worcester, Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn, Mich. S3	10.80
Dover, O. G6	10.80
Farrell, Pa. S3	10.80
Ind. Harbor, Ind. Y1	10.80
Sharon, Pa. S3	10.80
Warren, O. R2	10.80
Weirton, W. Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	8.175

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.10	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.06	10.40	12.60	15.60	....
Franklin Park, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	....
Los Angeles S41	11.15	12.60	14.80	....	....
New Britain, Conn. S15	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. B4, M23	8.95	10.10	12.60	15.60	....
New Haven, Conn. D2	9.40	10.70	12.90	15.90	....
New Kensington, Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	....	....	18.85	22.95	27.80
Buffalo W12	....	....	18.85	....	....
Fostoria, O. S1	....	....	19.05	22.15	....
Franklin Park, Ill. T6	....	....	19.20	23.30	28.15
Harrison, N.J. C18	....	....	18.85	22.95	27.80
New York W3	....	....	18.85	22.95	27.80
Palmer, Mass. W12	....	....	18.85	....	....
Trenton, N.J. R5	....	....	18.85	22.95	27.80
Worcester, Mass. A7, T6	....	....	18.85	22.95	27.80
Youngstown S41	....	....	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover, O. G6	7.425*
Evanston, Ill. M22	7.525*
McKeesport, Pa. E10	7.50*
New Castle, Pa. M22	7.425*
Riverdale, Ill. A1	7.525*
Warren, O. B9, S3, T5	7.425*
Worcester, Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3	7.50
Sharon, Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell, Pa. S3	5.525
Riverdale, Ill. A1	5.675
Sharon, Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
Granite City, Ill. G4	9.20	9.45	9.85
Indiana Harbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
Sparrows Point, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
Indiana Harbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$8.20
Fairfield, Ala. T2	8.30
Fairless, Pa. U5	8.30
Fontana, Calif. K1	8.85
Gary, Ind. U5	8.20
Granite City, Ill. G4	8.30
Ind. Harbor, Ind. I-2, Y1	8.20
Irvin, Pa. U5	8.20
Niles, O. R2	8.20
Pittsburg, Calif. C11	8.85
Sparrows Point, Md. B2	8.20
Weirton, W. Va. W6	8.20
Yorkville, O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	7.85
Gary, Ind. U5	7.85
Granite City, Ill. G4	7.95
Ind. Harbor, Ind. Y1	7.85
Irvin, Pa. U5	7.85
Yorkville, O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$10.05
Irvin, Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom, W. Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
Granite City, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
Indiana Harbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65
					Stator
Vandergrift, Pa. U5					8.10
Mansfield, O. E6					8.10
Warren, O. R2 (Silicon Lowcore)					8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
Beech Bottom, W. Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2	8.00
Aliquippa, Pa. J5	8.00
Alton, Ill. L1	8.20
Atlanta A1	8.00
Bartonville, Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville, Ind. M8	8.10
Donora, Pa. A7	8.00
Duluth A7	8.00
Fairfield, Ala. T2	8.00
Fostoria, O. (24) S1	8.10
Houston S5	8.25
Jacksonville, Fla. M8	8.35
Johnstown, Pa. B2	8.00
Joliet, Ill. A7	8.00
Kansas City, Mo. S5	8.25
Kokomo, Ind. C16	8.10
Los Angeles B3	8.95
Minnequa, Colo. C10	8.25
Monessen, Pa. P7, P16	8.00
Palmer, Mass. W12	8.30
Pittsburg, Calif. C11	8.95
Portsmouth, O. P12	8.00
Rankin, Pa. A7	8.00
S. Chicago, Ill. R2	8.00
S. San Francisco C10	8.95
Sparrows Point, Md. B2	8.10
Sterling, Ill. (1) N15	8.00
Sterling, Ill. N15	8.10
Struthers, O. Y1	8.00
Waukegan, Ill. A7	8.00
Worcester, Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria, O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora, Pa. A7	12.65
Duluth A7	12.65
Johnstown, Pa. B2	13.40
Kansas City, Mo. U3	12.90
Minnequa, Colo. C10	12.775
Monessen, Pa. P7, P16	12.65
Muncie, Ind. I-7	13.60
New Haven, Conn. A7	12.95
Palmer, Mass. W12	13.70
Pittsburg, Calif. C11	13.45
Portsmouth, O. P12	12.65
Roebling, N.J. R5	12.95
Sparrows Pt., Md. B2	13.50
Struthers, O. Y1	13.40
Trenton, N.J. A7	12.95
Waukegan, Ill. A7	12.65
Worcester, Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Johnstown, Pa. B2	9.75
Kansas City, Mo. S5, U3	10.00
Kokomo, Ind. C16	9.85
Los Angeles B3	10.70
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
New Haven, Conn. A7	10.05
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. San Francisco C10	10.70
Sparrows Pt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7, J4, T6	10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5	9.75
Alton, Ill. L1	9.95
Bartonville, Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora, Pa. A7	9.75
Duluth A7	9.75
Fostoria, O. S1	9.80
Johnstown, Pa. B2	9.75
Kansas City, Mo. S5, U3	10.00
Los Angeles B3	10.70
Millbury, Mass. (12) N6	10.05
Minnequa, Colo. C10	9.95
Monessen, Pa. P7, P16	9.75
Muncie, Ind. I-7	9.95
Palmer, Mass. W12	10.05
Pittsburg, Calif. C11	10.70
Portsmouth, O. P12	9.75
Roebling, N.J. R5	10.05
S. Chicago, Ill. R2	9.75
S. San Francisco C10	10.70
Sparrows Pt., Md. B2	9.85
Struthers, O. Y1	9.75
Trenton, N.J. A7	10.05
Waukegan, Ill. A7	9.75
Worcester, Mass. A7, J4, T6	10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1	16.50
Bartonville, Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville, Ind. M8	16.40
Fostoria, O. S1	16.30
Houston S5	16.55
Jacksonville, Fla. M8	16.65
Johnstown, Pa. B2	16.30
Kansas City, Mo. S5	16.55
Kokomo, Ind. C16	16.30
Minnequa, Colo. C16	16.55
Monessen, Pa. P16	16.30
Muncie, Ind. I-7	16.50
Palmer, Mass. W12	16.60
S. San Francisco C10	17.15
Waukegan, Ill. A7	16.30
Worcester, Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville, Ill. K4	13.45
Buffalo W12	13.45
Fostoria, O. S1	13.45
Johnstown, Pa. B2	13.45
Monessen, Pa. P7	13.45
Muncie, Ind. I-7	13.65
Palmer, Mass. W12	13.75
Portsmouth, O. P12	13.45
Roebling, N.J. R5	13.75
St. Louis L8	13.45
Sparrows Pt., Md. B2	13.55
Struthers, O. Y1	13.45
Worcester, Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
Franklin Park,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va., W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F8	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)

	An'ld Galv.	Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality (6 to 8 gage)

	An'ld Galv.	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+ 55
Bulk	+ 16

Flat Head Cap Screws:

⅜ in. and smaller, 6 in. and shorter:

Packages	+ 85
Bulk	+ 38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packages	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packages	+ 29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ⅛ in., larger 12.85

⅛ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.00[illegible]
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		⅝		¾		1		1¼	
List Per Ft	5.5c		6c		8.5c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	30.00	42.25	44.50	40.00	40.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-S CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.506	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.006
13.5	4	3	....	....	T-3	2.106
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Minimum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb. except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except; Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no change.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.65	9.80	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	10.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.98	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.43	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	8.83	10.46	10.50	52.00	11.11	8.86	11.01	16.23	9.47	8.78	10.94
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	10.03	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	61.27	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Memphis, Tenn.	9.84	10.05	....	....	11.24	9.92	12.74	....	10.33	10.12	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	9.24	10.70	11.45	....	10.90	9.34	11.15	16.45	9.83	9.17	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.06
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	10.00	10.89	52.71	10.85	9.25	11.95	16.38	9.45	9.20	10.45
Pittsburgh	8.57	9.98	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	10.20	12.05	12.35	....	12.20	10.20	16.65	17.80	10.80	10.35	12.50
St. Louis	8.77	10.58	10.53	....	10.94	8.77	11.28	16.33	9.14	8.62	10.91
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.45	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. x 36 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

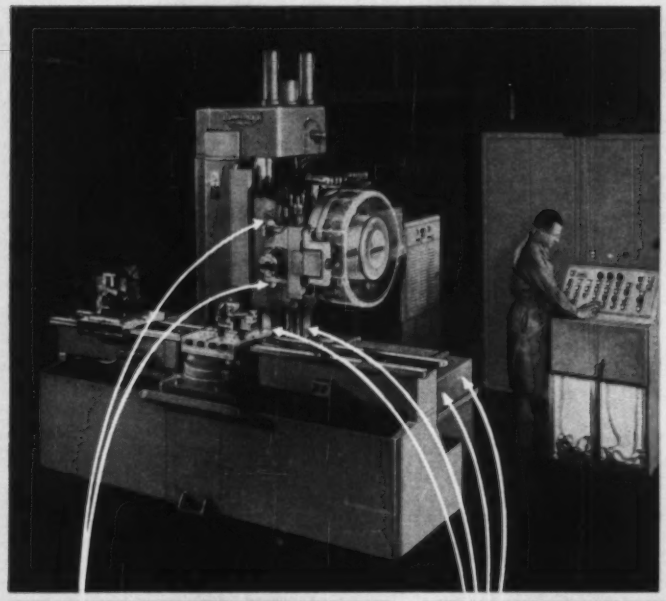
O-KNI-CO METALWORKING news

PRODUCTION FACTS THAT INCREASE YOUR PROFITS

PUBLISHED BY THE OHIO KNIFE CO., CINCINNATI, OHIO

KEARNEY & TRECKER USE HARDENED WAYS MADE BY THE OHIO KNIFE CO. ON NEW MILWAUKEE-MATIC MACHINE

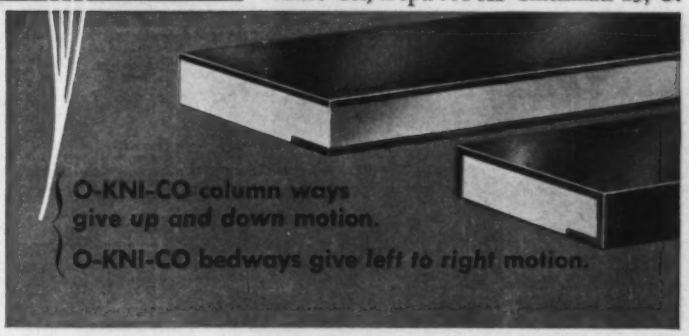
CONTINUOUS ACCURACY OF MACHINE ASSURED THROUGH HIGH WEAR RESISTANT QUALITIES OF O-KNI-CO HARDENED WAYS



Kearney & Trecker's new Milwaukee-matic with a tape fed numerical control system has to be able to deliver continuous accuracy. That's why hardened ways made by The Ohio Knife Co. were installed. O-KNI-CO ways guarantee continuous machine tool accuracy because of the special way in which they are made. By a time proven process, special analysis tool steel of any thickness is eternally bonded to a soft, tough, easily machinable steel, producing a way that will not warp or bow. Special O-KNI-CO hardening process (65-66 Rockwell C) to the full depth of the tool steel, along the entire length of the way, develops amazing wear resistant qualities.

Ordinary ways of one type steel are usually heat treated by flame hardening, carburizing, etc. This results in variations of depth and quality of hardness along the length of the way. Their degree of hardness is usually well below the minimum standard (63 Rockwell C), necessary to eliminate galling, scoring and excessive wear. These conditions destroy the accuracy of the machine from the very first day of operation, requiring continuous compensations in positioning of work. O-KNI-CO hardened ways are carried in stock in a variety of sizes and shapes and are made to suit specific requirements.

For complete information write The Ohio Knife Co., Dept. 111-AF Cincinnati 23, O.



Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11 60
Lump, ½ in. and up	12.85
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River: 100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe. 36.75. ton, del. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots 41.80	
Brass, 80/20, leaded (60 mesh)	39.90
Bronze, filter powder, 90/10	47.00*
Cobalt, 50 mesh	1.58
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver	60.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90
Tungsten: Carbon and hydrogen reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.65	$5.55	$5.55	$5.40	$5.75
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	5.85	5.75	5.75	5.60	5.95
Sheets, H.R.	Nom.	Nom.	Nom.	Nom.	Nom.
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	Nom.	Nom.	Nom.	Nom.	Nom.
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	Nom.	Nom.	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.70	25.14	24.85	24.85	26.02
Barbed Wire (†)	6.15	6.05	6.05	5.90	6.25
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.35	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	6.50	6.35	6.35	6.70
Bright Common Wire Nails (§)	7.30	7.20	7.20	7.05	7.40

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-70%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%. fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 50-56%, C 6-8%, Si 4-7%, 22.00c; Cr 58-63%, C 5-8%, Si 3-6%, 22.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 53-63%, C 3-5%, Si 2.5% max., 26.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 33.50c per lb contained Cr.; 0.010% max, 34.50c. Delivered.

Cr, 65-71%, carload, lump, bulk, 0.025% max, 35.00c; 0.05% max, 34.00c; 0.10% max, 33.75c; 0.20% max, 33.50c; 0.50% max, 33.25c; 1.0% max, 33.00c; 1.5% max, 32.75c; 2.0% max, 32.50c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr: 39-41%, Si 42-45%, C 0.05% max, 24.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 24.50c per lb contained Cr, 14.60c per lb contained Si; 0.75 in x down, 26.25c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅝ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3⅛ lb and containing 2 lb of Mn and approx ⅛ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (CB 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Scrap Needs Strong Demand Push

STEEL's composite on No. 1 heavy melting grade rises 34 cents to $32.67. Index has fluctuated within a $3 range since last February. Exports provide current market feature

Scrap Prices, Page 258

• **Pittsburgh**—No. 1 heavy melting scrap is up $1 on the basis of prices paid local dealers for shipment to Waren, Ohio. Renewed consumer interest in short turnings and No. 1 dealer bundles has upped those grades to $21 and $34. Otherwise, the market is quiet. Trade sources believe bids on industrial bundles will be lower than last month's.

• **Chicago**—Prices are holding despite the absence of important buying. Actually, the market is untested so far as the dealer grades are concerned. The quiet market is expected to continue until bids are opened late this month on the September offerings of No. 1 factory bundles by the district's two auto stamping plants.

• **Philadelphia**—Domestic demand continues slow, with no early improvement in prospect. Prices are unchanged; exports are providing some support for the open hearth grades. Three cargoes are being loaded here.

The Fairless Works (U. S. Steel) has closed on a fairly sizable tonnage of No. 2 bundles at $25, delivered. It's the first time Fairless has been in the market since last October. The price paid is in excess of the export level, and forces the market up $4.50. The significance of the purchase is not clear, but some market observers think it reflects the effects of the railroad tieup in the Pittsburgh area.

• **New York** — Brokers' buying prices are unchanged, due to strong export demand. Domestic business is lagging. Foreign trade is holding up better than at most eastern ports, but all Atlantic ports are feeling the effects of increased competition from Great Lakes ports. Freight rates from the lakes are a little higher, but heavy industrial scrap at Chicago, Milwaukee, Detroit, Cleveland, and Buffalo, is in freer supply and, accordingly, less costly.

• **Cleveland**—The market appears to be a little stronger, though buying continues to be limited to small lots. Prices are unchanged but are considered nominal, with No. 1 heavy melting holding around $31-$32. Bidding on monthend auto lists is expected to point the way for prices the next several weeks.

• **Detroit** — The market appears softer, though the absence of orders makes it difficult to determine the exact level of prices. Little material is being generated, and the mills are not buying. The outlook is for another price drop when auto lists come out this week.

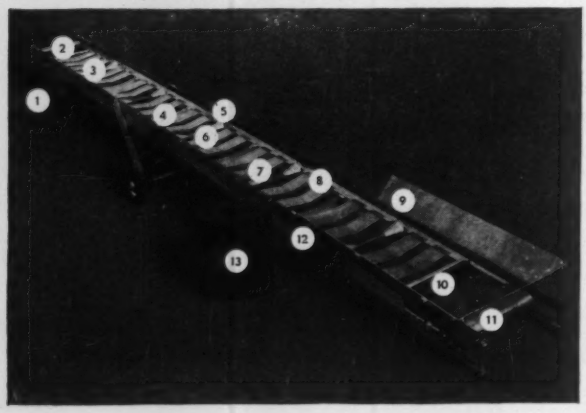
Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2303H North 11th St. • St. Louis 6, Mo.

HOT DIP GALVANIZING
JOSEPH P. CATTIE & BROTHERS, INC.
2520 East Hagert Street
Phone: Re-9-8911 Philadelphia 25, Pa.

LOOKING FOR SURPLUS MACHINERY?
By checking the classified pages of STEEL each week you'll be able to find many different types of equipment which will fit your requirements. Used or surplus equipment—you can best find it in STEEL's classified columns.



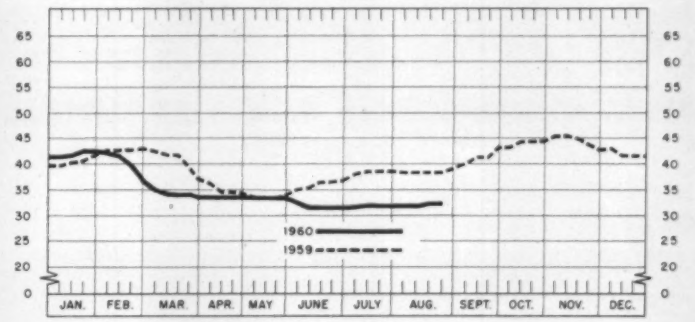
FARNCO SALES COMPANY
6713 Formosa Way, Pittsburgh 8, Pa.

these lightweight FARNCO conveyors...
take steel mill abuse better because of these features...

1. Air or electric motor
2. Crowned head pulley
3. Clean out opening and scraper
4. Cone carrier
5. Anti-friction bearings thruout
6. Angle braces
7. Shock plates
8. Wear strip
9. Alloy hopper 4'-0" long
10. Clean out opening and scraper
11. Head and crowned tail pulley
12. Extruded aluminum alloy frame
13. Belt rubber covered

STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL.



Aug. 24 1960	Week Ago	Month Ago	Year Ago	July Avg.
$32.67	$32.33	$31.33	$38.33	$31.63

• **Buffalo**—Cast scrap sales have been made in representative tonnage to local foundries at prevailing prices, and cupola cast continues at $40-$41.

• **Cincinnati**—District mills are expected to enter the market this week, but their buying plans call for the placing of only limited tonnages. No change in prices is anticipated, with brokers offering $26.50-$27.50 for No. 1 heavy melting steel. Turnings and borings are stronger; they're being quoted $1 higher, and supplies are more restricted than they were. The cast iron grades are also showing some strength on out-of-district sales.

• **St. Louis**—Prices are unchanged, and the outlook is for no major change in the market in the immediate future. The mills are not showing much interest in offerings, though dealers are selling the little tonnage that's coming in to them.

• **Birmingham**—Demand has picked up slightly, but one local steelmaker has held up shipments temporarily. No. 1 bundles are now quoted $29-$30; No. 2 bundles $20-$21; machine shop turnings $16-$17; shoveling turnings $18-$19; bar crops and plates $37-$38; structurals and plates $36-$37; electric furnace material (3 ft and under) $33-$34; 2 ft and under, $34-$35.

• **Houston**—Steelmaking operations have been cut back farther, but scrap prices have not yet reflected the continued slowing down. Lone Star Steel cut production in most departments, including open hearths, rolling mills, and ore mines. Blast furnace and coke ovens are operating on a limited basis. About 1500 to 2000 workers out of a normal force of 4500 are affected.

• **Los Angeles**—Prices continue unstable, and are mostly nominal in the absence of strong domestic demand, which currently accounts for only about 5 per cent of total sales.

• **Seattle**—Prices are firm, with buying slightly more active. Larger consumers are reported replenishing their inventories, and exports continue active.

• **San Francisco** — Except for tonnage moving for export, the scrap market here is at a standstill. Only token purchases are being made by area steel mills as they await improved steel demand to stimulate increased steelmaking operations.

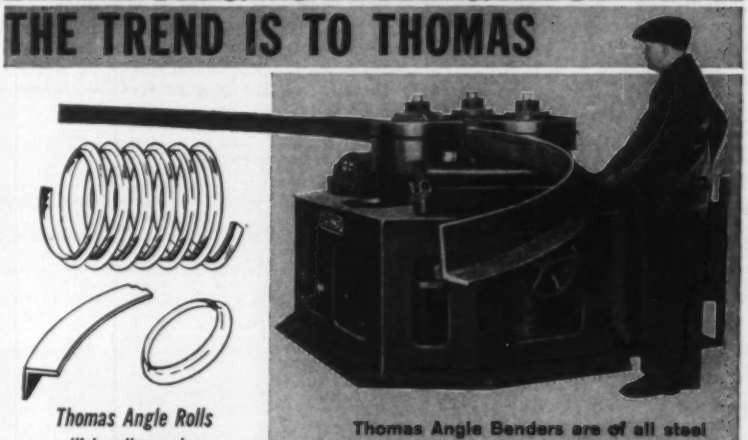
Scrapmen Are Asking ICC For Freight Rate Relief

The Institute of Scrap Iron & Steel and 360 member companies have filed a complaint with the Interstate Commerce Commission involving freight rates charged on iron and steel scrap by 49 Eastern Territory railroads. They contend: A

(*Please turn to Page 263*)

FOR SEGMENT OR CIRCLE BENDING OF ANGLES

THE TREND IS TO THOMAS



Thomas Angle Rolls will handle angles up to 6 x 6 x 7/8"

Thomas Angle Benders are of all steel construction and come in two styles and four sizes. Standard rolls permit "leg in" and "leg out" bending of angles. The machines may be converted for bending flats, rounds, squares, beams, channels, pipe and other shapes.

THOMAS MACHINE MANUFACTURING CO.

PITTSBURGH 23, PA.

Write for Bulletin 314-A

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Aug. 24, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 24	$32.67
Aug. 17	32.33
July Avg.	31.63
Aug. 1959	38.64
Aug. 1955	43.97

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 dealer bundles	*33.00-34.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	*31.00-32.00*
No. 1 factory bundles	37.00-38.00
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*15.00-16.00*
Short turnings	*20.00-21.00*
Cast iron borings	*19.00-20.00*
Cut structurals:	
2 ft and under	37.00-38.00
3 ft and under	36.00-37.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	39.00-40.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	34.00-35.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	37.00-38.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	47.00-48.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	32.00-33.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 hvy melting	28.00-29.00
No. 1 factory bundles	37.00-38.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	32.00-33.00
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	35.00-36.00
Punchings & plate scrap	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	36.00-37.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	46.00-47.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	43.00-44.00
Axles	53.00-54.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles, solids	175.00-180.00
18-8 turnings	*90.00-95.00*
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.00-26.00*
No. 2 heavy melting	*13.00-14.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	*14.50-15.50*
No. 1 busheling	*24.00-25.00*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-11.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Stove plate	*29.00-30.00*
Heavy breakable	*29.00-30.00*
Unstripped motor blocks	*21.00-22.00*
Charging box cast	*29.00-30.00*
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	23.00-24.00
No. 1 factory bundles	34.00-35.00
No. 1 bundles	31.00-32.00
No. 2 bundles	17.00-18.00
No. 1 busheling	31.00-32.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	34.00-35.00
Cut structurals, plate 2 ft and under	*37.00-38.00*
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00†

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	45.00-46.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random length	44.00-45.00
Cast steel	38.00-39.00
No. 1 railroad cast	46.00-47.00
Railroad specialties	44.00-45.00
Angles, splice bars	46.00-47.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	25.00-26.00
No. 1 busheling	33.00-34.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.50-35.50

BUFFALO

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00†
No. 1 bundles	29.00-30.00
No. 2 bundles	21.00-22.00
No. 1 busheling	29.00-30.00
Shovel turnings	16.00-17.00
Machine shop turnings	12.00-13.00
Cast iron borings	14.00-15.00
Low phos. structurals and plate, 2 ft and under	37.00-38.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	47.00-48.00

Railroad Scrap

Rails, random lengths	41.00-42.00
Rails, 3 ft and under	47.00-48.00
Railroad specialties	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	17.50-18.50
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	*13.00-14.00*
Cast iron borings	*13.00-14.00*
Low phos. 18 in.	35.00-36.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Heavy breakable cast	31.00-32.00
Charging box cast	35.00-36.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	51.00-52.00
Rails, random lengths	43.00-44.00

PHILADELPHIA

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	36.00
No. 2 bundles	*24.00-25.00*
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00
Machine shop turnings	15.00
Heavy turnings	28.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	40.00
Rail crop, 2 ft & under	51.00-52.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	40.00
Drop broken machinery	50.00
Malleable	46.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips, solids	165.00-170.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.00-24.50
No. 2 heavy melting	19.00-20.00
No. 1 bundles	24.00-24.50
No. 1 busheling	24.00-24.50
Machine shop turnings	6.00-7.00
Shovel turnings	8.50-9.00
No. 1 cast	39.00-40.00
Mixed cupola cast	33.00-33.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	31.00-32.00
Cast iron borings	10.00-11.00
Machine shop turnings	*16.00-17.00*
Shovel turnings	*18.00-19.00*
Bar crops and plate	*37.00-38.00*
Structurals & plate	*36.00-37.00*
Electric furnace bundles	32.00-33.00
Electric furnace:	
3 ft and under	*33.00-34.00*
2 ft and under	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	46.00-47.00
Unstripped motor blocks	35.00-36.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	39.00-40.00
Angles, splice bars	39.00-40.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00
No. 2 heavy melting	28.00
No. 1 bundles	33.00
No. 2 bundles	19.00
No. 1 busheling	33.00
Machine shop turnings	9.00
Shovel turnings	11.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	36.00
Heavy breakable cast	34.00
Unstripped motor blocks	36.00
Clean auto cast	44.00
Stove plate	36.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00
Rails, random lengths	37.00
Rails, rerolling	51.00
Rails, 18 in. and under	41.00
Angles, splice bars	41.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 2 bundles	18.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	34.00-34.50
Heavy breakable	25.00
Foundry malleable	31.00†
Unstripped motor blocks	28.00-28.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

LOS ANGELES

(For export)

No. 1 heavy melting	*32.00*
No. 2 heavy melting	*24.00*
No. 1 bundles	*27.00*
No. 2 bundles	*17.00*
Machine shop turnings	*17.00†*
Shovel turnings	*17.00†*
Cast iron borings	*17.00†*
Cut structurals and plate 1 ft and under	*43.00*

Cast Iron Grades

No. 1 cupola	*43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*28.00-30.00†*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00-38.00
No. 2 heavy melting	32.00-35.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 1 hvy (unprepared)	35.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	33.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	36.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

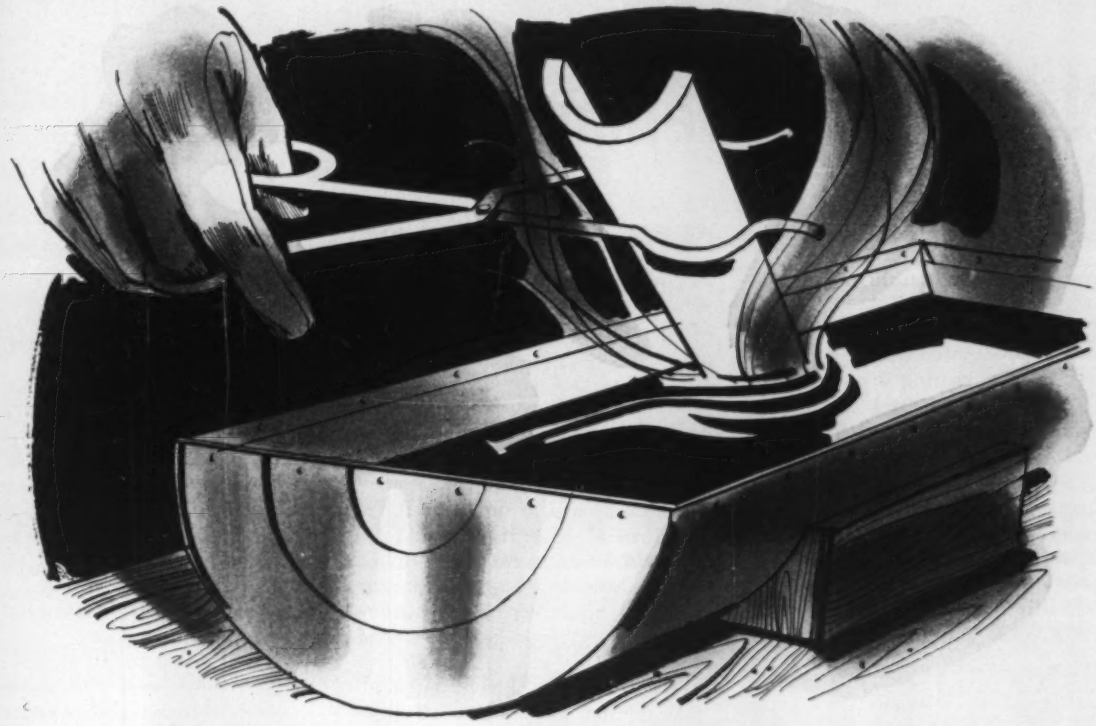
No. 1 heavy melting	25.80
No. 2 hvy melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

†Nominal.
‡F.o.b. Hamilton, Ont.

S-E-G-R-E-G-A-T-E-D SCRAP IS WORTH MORE



Rub specimen with file to obtain clean surface. Add 1 drop of 1.1 nitric acid. If there is a definite attack, submit sample to spark test. A typical short chromium spark will separate the sample from non-stainless metals. Heat specimen to 1850 deg. F. and oil quench. Test for hardness. A Rockwell C hardness in the range of 48/55 will indicate the carbon content typical of stainless steel type 420. It is well to have a known sample for comparison.

Here is how to test for

STAINLESS STEEL TYPE 420

Type 420 is the famous cutlery grade of stainless steel. With its excellent corrosion resistance, toughness and ability to withstand abrasion, it has become an important member of the stainless steel family. In addition to its use for cutlery, this type is excellent for surgical instruments, high spring temper applications, bushings, bearings, valves and other wear-resisting parts where extra hardness is required.

For scrap of known analysis, our personnel, equipment and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

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Nonferrous Demand Loafs Along

Nonferrous Metal Prices, Pages 262 & 263

IF A BUSINESS upturn is in sight, it hasn't appeared on the nonferrous horizon.

• **Suspended Animation**—Forecasts have taken a beating since the start of the second quarter when the market ran out of pep. And sales are still slumbering.

July business was miserable. August sales have been only a trifle better. September will bring some improvement, though pickups will probably be spotty.

Fourth quarter defies prediction. Metalmen don't know what to forecast because their customers haven't given any indication of buying plans. Yet there's little pessimism. Everyone seems pretty confident the fourth quarter will bring better things, though only a few hardy optimists foresee a sales recovery strong enough to lift 1960 over the 1959 mark.

• **Inventories Key**—One reason for guarded optimism: The conviction that customer inventories have seldom been lower—meaning that any improvement in customer business will immediately be translated into rush orders for metal. Currently, orders are for immediate shipment, say metalmen, proving that the workoff of stocks has just about run its course.

• **Prices Holding**—Despite the weak market, prices have been generally stable, and there's little indication of much movement soon.

Copper is being partially propped by unsettled conditions in the Congo and the possibilities of labor strife in Chile in the fall. Domestic sales have been slow. Exports to Western Europe have stayed high. Stability of the scrap price at a relatively high level is a partial reason why the custom smelter quotation has held.

Shipments of brass and bronze ingots hit an 11-year low in July (14,887 tons). Reason: An across-the-board slump in demand from major customers whose sales are lagging. Through July, 1960 shipments totaled 143,866 tons compared with 165,351 tons in the like period of 1959. Price outlook: Probably no official cut in list quotations, but you can look for some shading to continue.

Lead and zinc sales, while still poor, aren't quite so anemic as they were earlier in the summer. Prices look firm at 12 cents a pound for lead and 13 cents for zinc. Rolled zinc products have been hurt by the general slump in business and heavy imports, but there's little likelihood of a price drop unless the slab zinc price falls at least 1 cent a pound.

Aluminum sales are up a little domestically, though still far under forecasts. Exports continue to give the metal a boost. While 1960 shipments won't set any records, the industry is heading for an all-time high in production (see chart).

Maybe a Lead-Zinc Bill

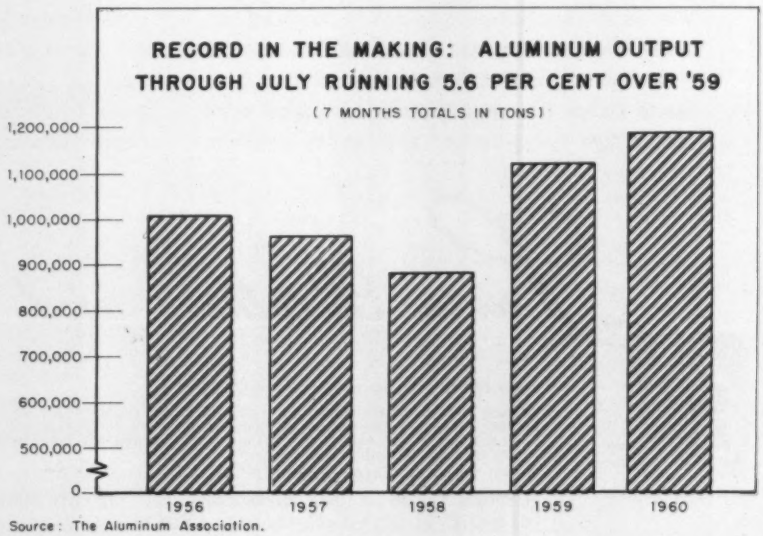
It's up to the President to decide whether the lead-zinc industry gets government assistance. Congress has passed and forwarded to the White House a subsidy bill for small miners. Sponsored by Rep. Ed Edmondson (D., Okla.), the bill would authorize payment of the difference between the market price and a subsidized price of 17 cents a pound for lead and 14.5 cents for zinc. Payments would be made only on quantities up to 2000 tons of each metal annually and only to companies that do not exceed the production figure.

Capitol Hill observers say chances are 50-50 the bill will get Presidential approval. Political pressures may tilt the scale. The bill had some support from Republican congressmen up for re-election.

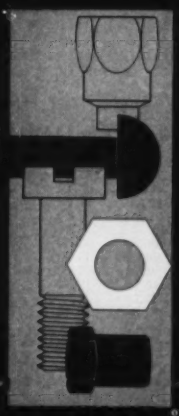
If the President signs the bill, the Kerr Bill to raise lead-zinc tariffs will probably be shelved, say observers—at least until a new administration takes over in 1961.

Market Memo

• A protective oxide film, produced through the selective oxidation of minor alloying elements, may be the answer to development of a tarnish resistant copper, believes the Copper Products Development Association Inc., a research group financed by the copper producers.

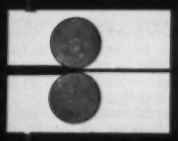


Source: The Aluminum Association.



COLD HEADING MACHINERY

Cold Headers • Parts Formers • Nut Formers • Slotters • Threaders • Pointers • Trimmers and other Cold and Hot Forming Equipment



ROLLING MILL MACHINERY

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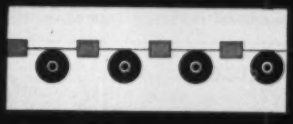

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WF 51R

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 30.70; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.35-4.50.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-24.25; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-24.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C. R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	..	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 30.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.00-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 3.00-3.50; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 16.00-16.50; segregated high copper clips, 14.50-15.00; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 26.00; light copper, 23.50; refinery brass (66% copper) dry copper content, 24.00.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 26.00; light copper, 23.50; No. 1 composition borings, 21.00; No. 1 composition solids, 21.50; heavy yellow brass solids, 16.00; yellow brass turnings, 14.50; radiators, 17.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50. 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 257*)

lot of scrap is transported via railroads in the Eastern Territory, but there is no rate incentive for loadings in excess of 80,000 lb; only a 15 per cent reduction is granted when loadings are 80,000 lb over the original 44,800 lb rates.

The ICC is asked to find that the prevailing rates on scrap are unreasonable, that the railroads be ordered to change the rate on 100,000 lb of scrap to 50 per cent of the present rates on 80,000 lb of new steel, and that the scrap rates be no greater than 150 per cent of the present rates on iron ore.

Pig Iron . . .

Pig Iron Prices, Page 252

Movement of merchant pig iron has increased slightly this month and is expected to make further gains in September. Most foundries have resumed operations following summer vacations, but production schedules are restricted.

Woodward Iron Co., Woodward, Ala., on Aug. 18 placed a second blast furnace in operation in response to a pickup in orders. The company has two idle furnaces. In Chicago, only 23 of the district's 43 blast furnaces are running. In Buffalo, only eight of 16 blast furnaces are turning out metal.

The first fairly sizable tonnage (3000 tons) of foreign iron in some time has arrived at the Philadelphia port. It's for a pipemaker.

Blast furnace production dropped to 4,523,497 tons in July (55.2 per cent of capacity) from 5,309,487 tons (66.9 per cent of capacity) in June, reports the American Iron & Steel Institute. The total for the first seven months was 46,097,720 tons (81.8 per cent of capacity) compared with 45,998,942 tons (83.7 per cent of capacity) in the like 1959 period. Production of 43,353 tons of ferromanganese and spiegeleisen was included in the July total and 452,544 tons in the January-July, 1960 total.

Distributors . . .

Prices, Page 252

Bookings by steel service centers continue to be slow. Competition from importers remains keen. Distributors in the Southeast posted two price reductions this year to meet foreign competition, but they do not expect another this year, "unless more foreign steel moves in along the coastal area."

Less foreign competition is evident in the Pacific Northwest, but competitive conditions, favoring Japanese steel producers, may cause the loss of most of the Alaskan markets to domestic steel sellers.

Rails, Cars . . .

Track Material Prices, Page 250

Freight car bookings in July totaled 1306 units, up noticeably from the 321 placed in June, reports the American Railway Car Institute. Bookings in July, 1959, amounted to 4159 cars. Deliveries were off in July, numbering 3893 units vs. 6042 the previous month and 4273 in July last year.

Cars on order and undelivered as of Aug. 1 amounted to 14,358 in railroad shops and 12,300 in commercial shops.

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Permanent positions with Arthur G. McKee & Company at their Cleveland offices for **ENGINEERS, DESIGNERS, DRAFTSMEN** who are experienced in any type of Steel Plant or Steel Plant Equipment design. Applications will be kept confidential.

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Coming Sept. 5 IN STEEL

The Fight for Survival in New World Market

Two million Americans have lost their livelihood to foreign competition since 1956. And world trade shifts have cost U. S. industry more than $4 billion in sales. Spurred by rapid expansion and lower wages, foreigners have been particularly successful in taking markets once held by U. S. metalworking. STEEL will devote next week's special issue to show how we can counterattack.

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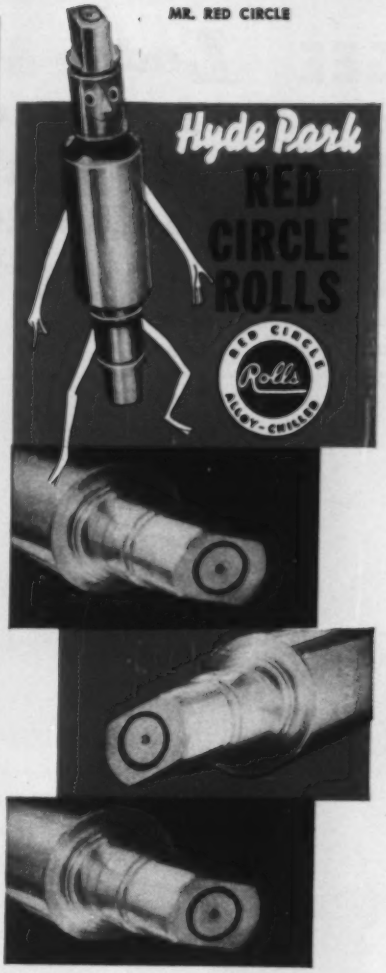


A Roll for Every Purpose

Our engineers will be glad to work with you in the production of any special rolls or rolling mill equipment.

IRON BASE TYPE ROLLS
Nickel Alloy Grain Rolls
Nickel Chilled Rolls
Grain Rolls
Chilled Rolls
Moly Rolls
Nodular Iron Rolls

Hyde Park
FOUNDRY AND MACHINE CO.

HYDE PARK
Westmoreland County, Penna.

Rolls
Rolling Mill Equipment
Gray Iron Castings

SEE Lodge & Shipley COMPLETE LINE

of LATHES • SHEARS • BRAKES • FLOTURN MACHINES

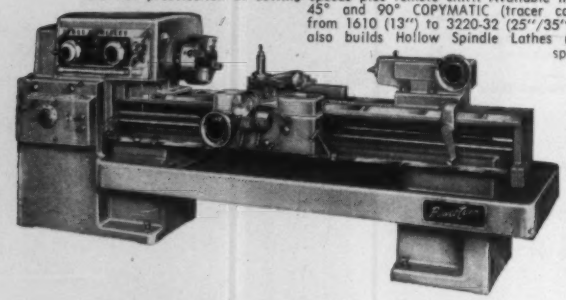
in operation at the Machine Tool Exposition

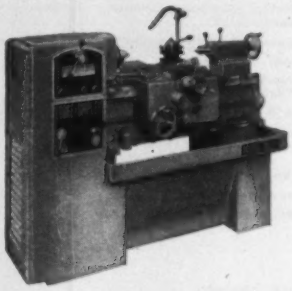
Booth 1046 • Exposition Hall • Chicago, Ill. • September 6-16

Lodge & Shipley equipment represents almost 100 years of experience in the design and manufacture of heavy metal working machinery . . . offers you the most advanced features for fast, accurate and versatile operation. Lodge & Shipley equipment is precision engineered, ruggedly constructed and honestly rated to give trouble-free, low-cost production.

LATHES

Lodge & Shipley POWERTURN Lathes combine accuracy and rugged strength with greater precision and operating convenience. Fast, foolproof Speed Dial headstock has just two dials for fast setting of speed changes. POWERSHIFT PRESELECTOR Lathes are even faster; single dial for preselection of cutting speeds plus remote shift. Available in Engine, Toolmaker, Gap, 45° and 90° COPYMATIC (tracer controlled) Lathes in sizes from 1610 (13") to 3220-32 (25"/35" Raised). Lodge & Shipley also builds Hollow Spindle Lathes (with large hole through spindle).

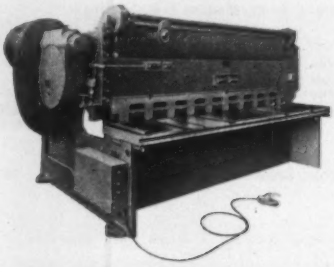


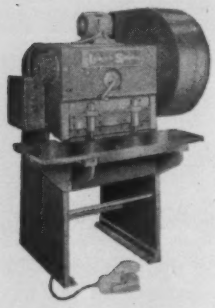


The Lodge & Shipley 1307 HI-TURN (10") Lathe is completely new in size, design, utility and even in its low price. It provides high speed turning, boring and facing capacity where the use of a leadscrew is of no consequence. The HI-TURN Lathe is extremely rugged and has nine geared speeds with a high spindle speed of 3000 rpm and 5 hp, giving the ability to handle newer, tougher metals at production rates. Also available with 45° hydraulic tracer slide and completely automatic cycling.

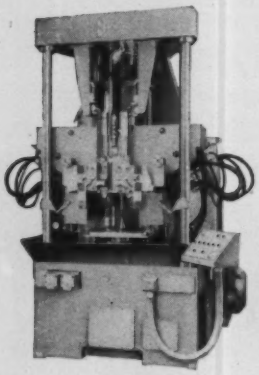
SHEARS

Featuring exclusive combination air clutch and brake which eliminates unnecessary gear wear, gives absolute overload protection, cushions shock. Many other features included in low base price. Capacities from 10 gauge to 5/16" mild steel.



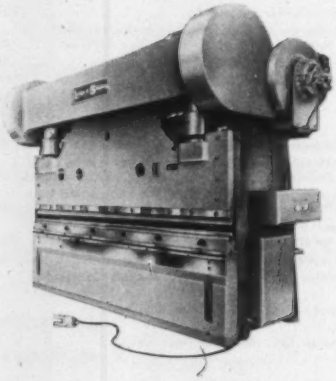


24" SPEED SHEAR . . . designed for accurate duplication of straight side parts without the expense of dies and punch press equipment. Production-proved for straight and angle shearing, slitting, notching, blanking and similar operations at speeds of 120 strokes per minute. Capacity: 10 gauge x 24" mild steel.



BRAKES

Rugged, powerful, heavy duty brakes with many features as standard. Specially-designed combination air clutch and brake installed in heavy, balanced flywheel requires no adjustment . . . known for trouble-free service. Available in capacities from 120 tons to 250 tons.



FLOTURN

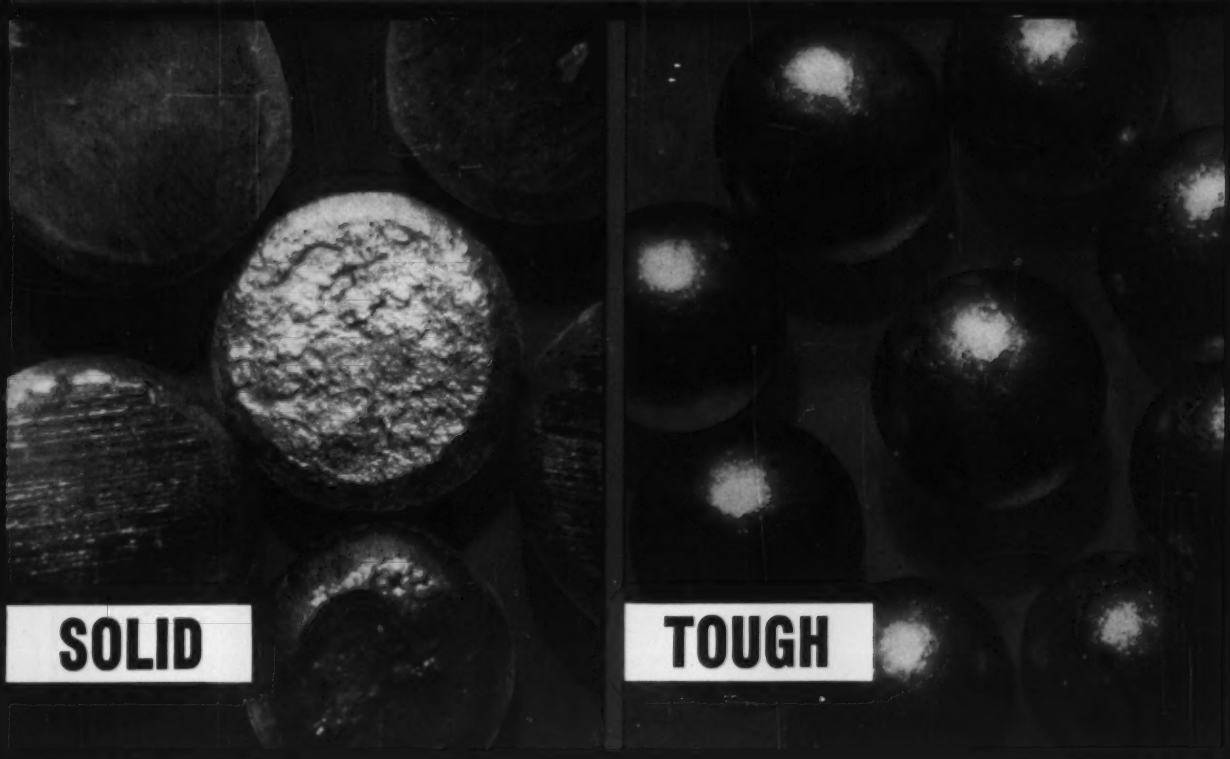
Completely new metal forming equipment and process originated by Lodge & Shipley . . . saves time, material and tooling cost. Makes spherical, conical and cylindrical shapes from simple blanks. Replaces many costly forging, drawing and machining operations. No. 12 Vertical Floturn illustrated; larger sizes and sub-contract service also available.

Detailed Literature on Request

THE Lodge & Shipley COMPANY

3070 Colerain Avenue — Cincinnati 25, Ohio

NOW ROTOBLAST STEEL SHOT PROVES IT CUTS ABRASIVE COSTS!



Rotoblast Steel Shot has already stacked up an impressive record of reduced costs in foundries* and blast cleaning departments* from coast to coast!

- Atlantic Coast steel foundry—Compared with premium abrasive formerly used, Rotoblast Steel Shot cuts abrasive costs *in half*—and gives better cleaning than before!
- Southwestern manufacturing company—Now uses 7 lbs. of Rotoblast Shot per wheel hour, compared to 23 lbs. of malleable shot previously used!
- Large automotive foundry—Rotoblast Shot consumption 30% less than other steel shot tested; cleans castings faster!
- Eastern steel plant—Now uses Rotoblast Shot to descale steel strip, after exacting lab tests proved it better than previous steel abrasives!
- Midwest forge shop—Found Rotoblast Shot reduced abrasive costs 23% below that of abrasives previously used!
- Steel tank company—Cut cleaning costs in half (from 4c to 2c per sq. ft.) when it switched to Rotoblast Steel Shot.

These examples are just some of the many proving Rotoblast's cost-cutting qualities! Arrange a trial in your plant! Talk to your Pangborn man or write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.* ®

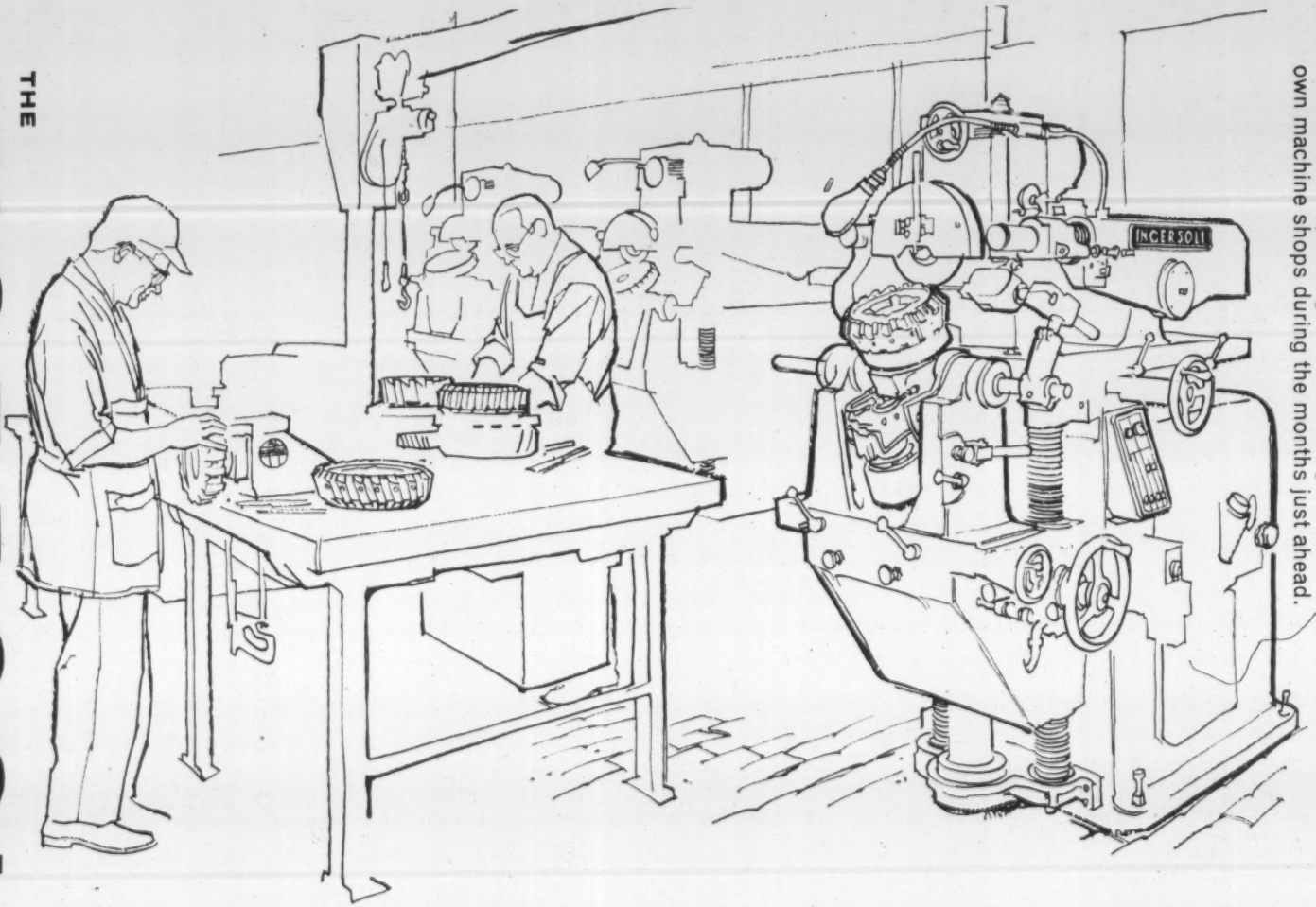
*Names available on request

Pangborn

ROTOBLAST®
STEEL SHOT & GRIT

NEW AT INGERSOLL....

This is one of a number of
NEW INGERSOLL MACHINES
which will be operating on our erecting floors or in our own machine shops during the months just ahead.



A NEW AUTOMATIC CUTTER GRINDER: Cam control of the grinding action makes it possible to control and repeat correct grinds indefinitely, thereby reducing production losses which result when cutters are poorly or inconsistently ground. One man can operate three of these new Ingersoll grinders, which are heavy, precision machines, kept maintenance-free by complete dust protection of moving parts. Using the machine itself to cut its own cams, the operator takes only a short time to produce a cam and completely set up the machine for grinding a new cutter.

THE **INGERSOLL**
MILLING MACHINE COMPANY
ROCKFORD, ILLINOIS